IRPL-R28

INTERSERVICE RADIO PROPAGATION LABORATORY
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NOMOGRAPHIC PREDICTIONS OF F2-LAYER FREQUENCIES THROUGHOUT THE SOLAR CYCLE, FOR JANUARY

The accompanying nomograms present predictions of f^oF2 and F2-4000 muf throughout the solar cycle, for each ten degrees of latitude in each of the three zones of Fig. 1.

These were derived in the manner described in the reports IRPL-R11, "A Nomographic Method for Both Prediction and Observation Correlation of Ionosphere Characteristics", and IRPL-R16, "Predicted F2-Layer Frequencies Throughout the Solar Cycle, for Summer, Winter, and Equinox Season". The method of their use in obtaining f^oF2 and F2-4000 muf is illustrated by the example shown on Fig. 45. The use of these quantities in obtaining the muf for high-frequency radio propagation is discussed in the report IRPL-R16, cited above, and in the IRPL Radio Propagation Handbook, Part 1, p.47 et seq. It is to be noted that the values of f^oF2 and F2-4000 muf obtained by means of these nomograms must be complemented by values of E-layer muf, in the case of transmission paths under 4000 km and by sporadic-E transmission frequencies for all paths, especially those passing near the auroral zones shown in Fig. 1. This is particularly important during times of minimum solar activity.

Values of f^oF2 obtained by meqns of these nomograms should be fairly accurate in the proximity of ionosphere observing stations which have been in operation for a long time, such as those at Washington, D.C., Watheroo, W. Australia, and Huancayo, Peru. Inaccuracy of prediction is most likely in equatorial regions, where the latitude gradient of f^oF2 is particularly high, and in the W zone south of Huancayo, Peru (12°S), where a few ionospheric observations have been made and thus the prediction is based upon observations in other zones.

The small convolutions of the central curves, A, which show the variation of f^oF2, are frequently of doubtful significance, since many of them may be less than the error or prediction. No attempt was made to smooth these out, however, because of lack of exact knowledge of the extent of this error.

Values of F2-4000 muf obtained from these nomograms are likely to be slightly too high during periods of high sunspot number, since the values of F2-M4000 used in their computation, the average of all available data, were those obtained during years of low solar activity, and there is a slight decrease in these values with increase of sunspot number. It is estimated that the amount of this error, at a sunspot number of 100, is about 5%.

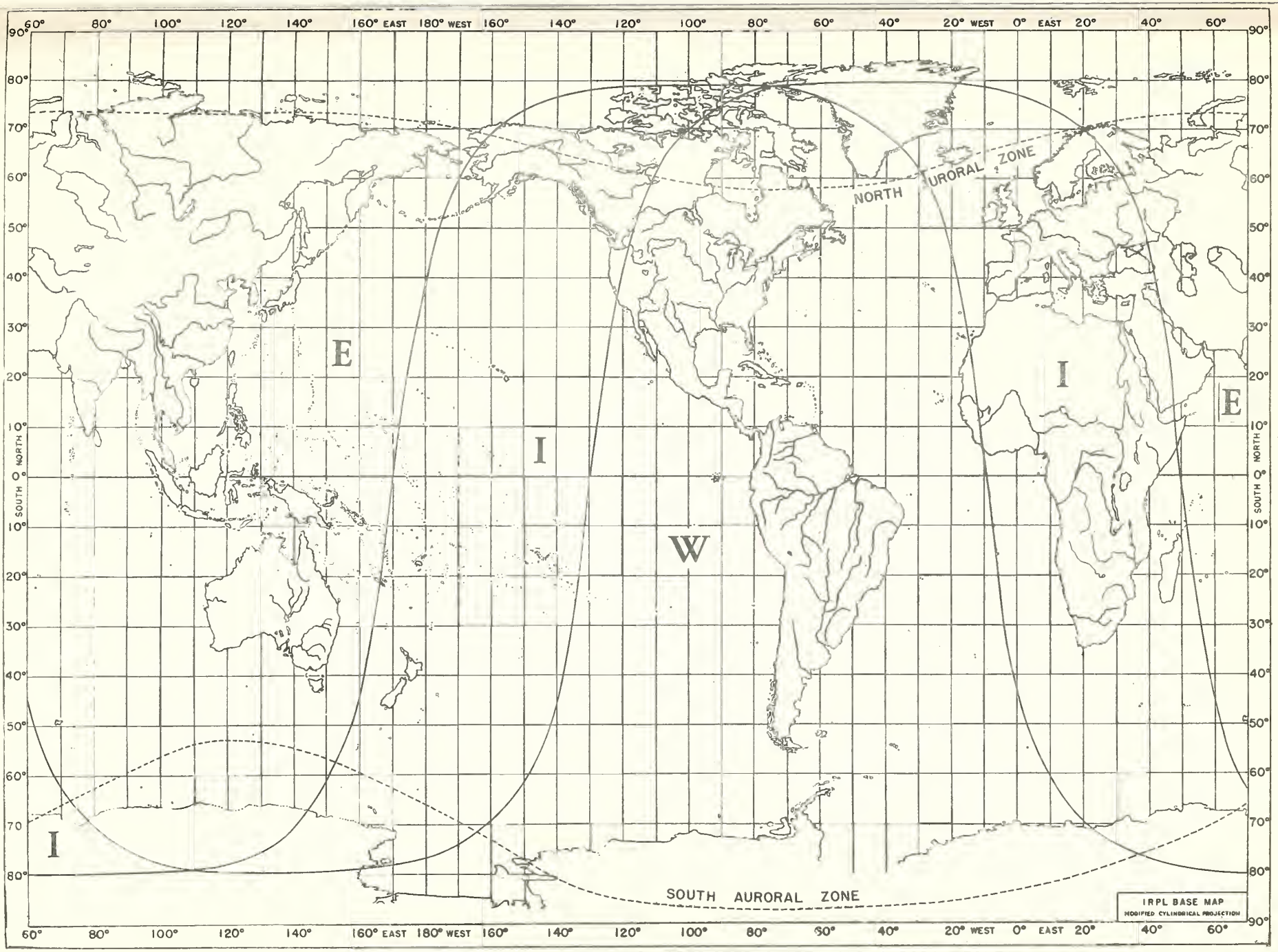

Fig. 1. WORLD MAP SHOWING ZONES COVERED BY PREDICTED CHARTS, AND AURORAL ZONES.

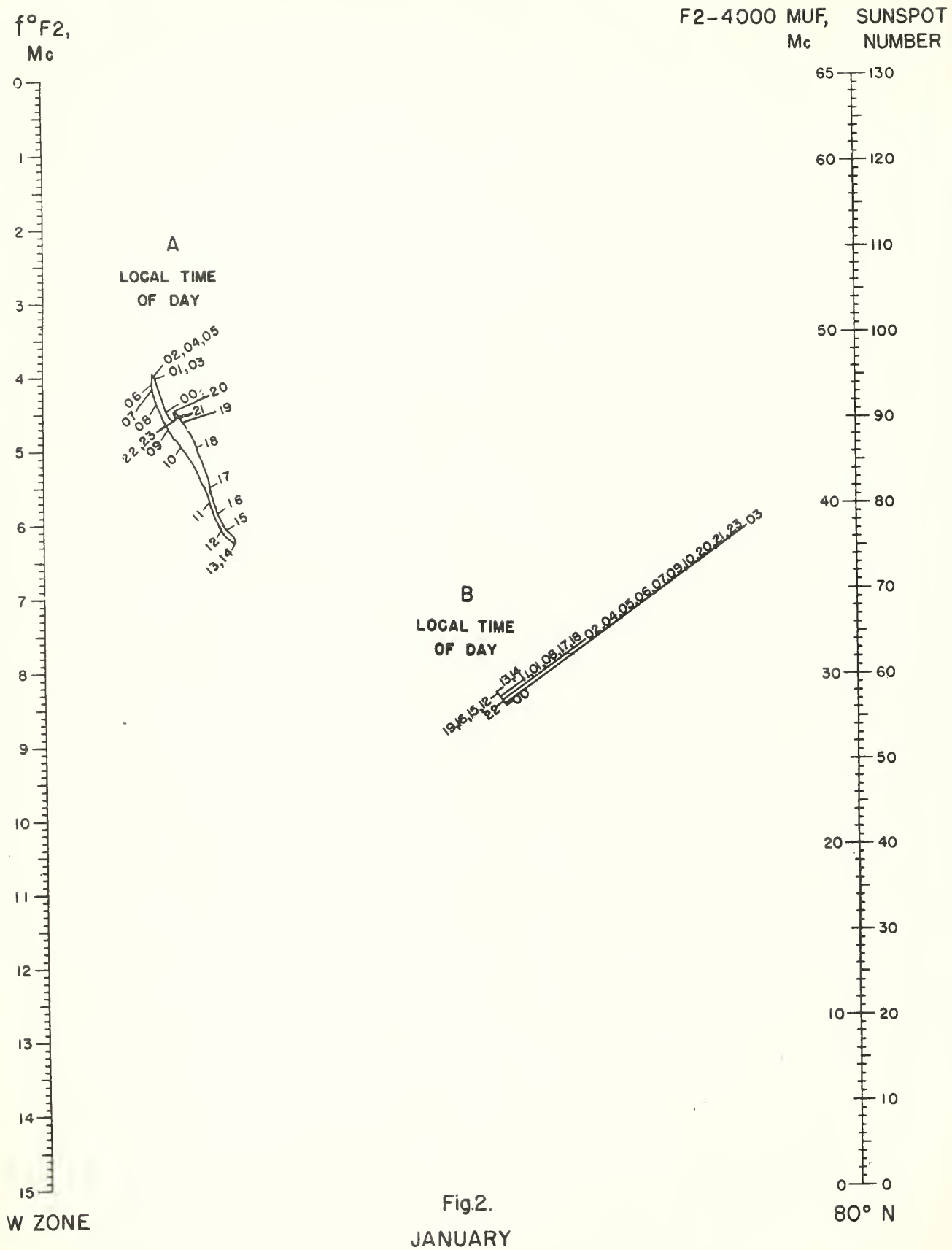

Fig.2.
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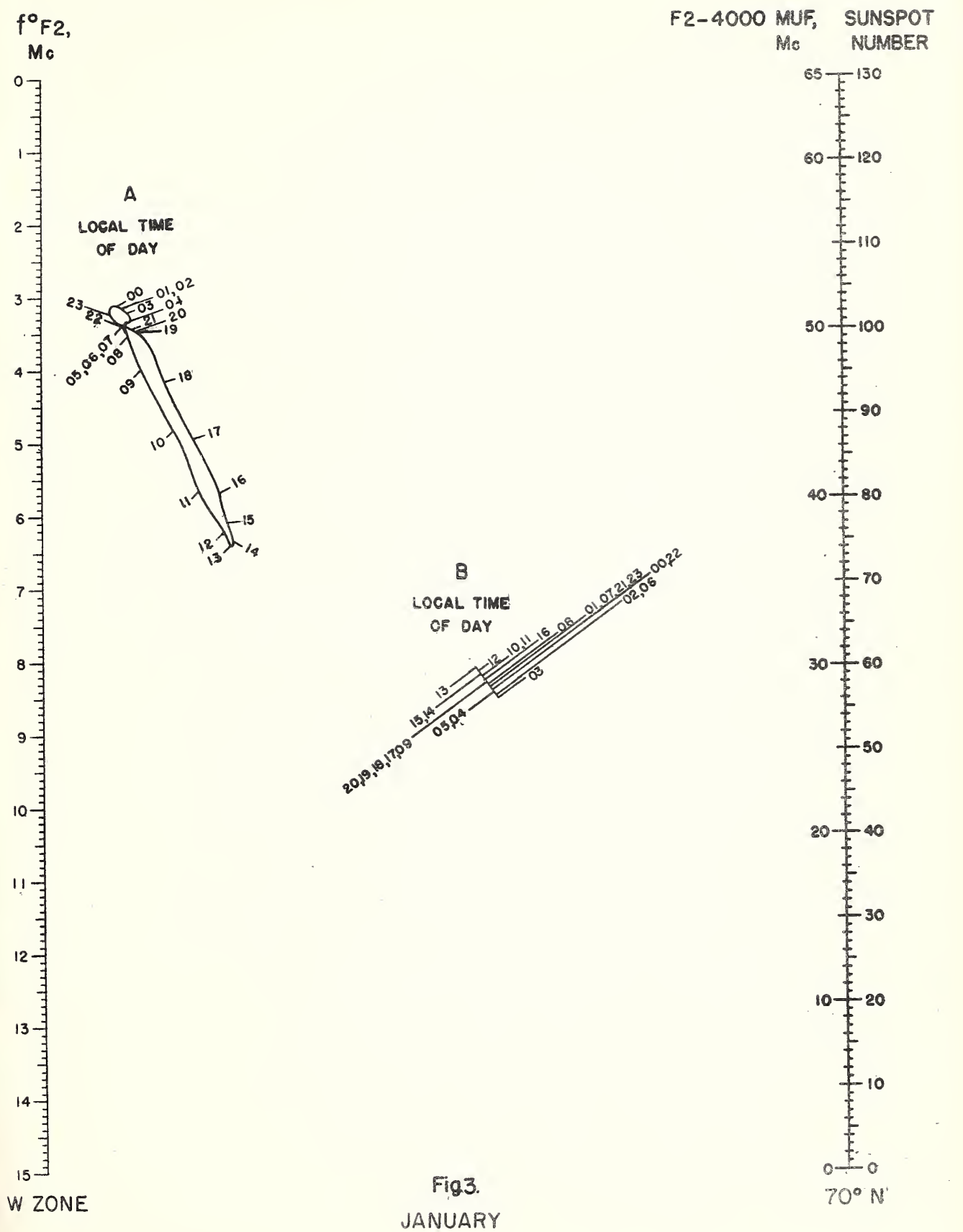

Fig.3.

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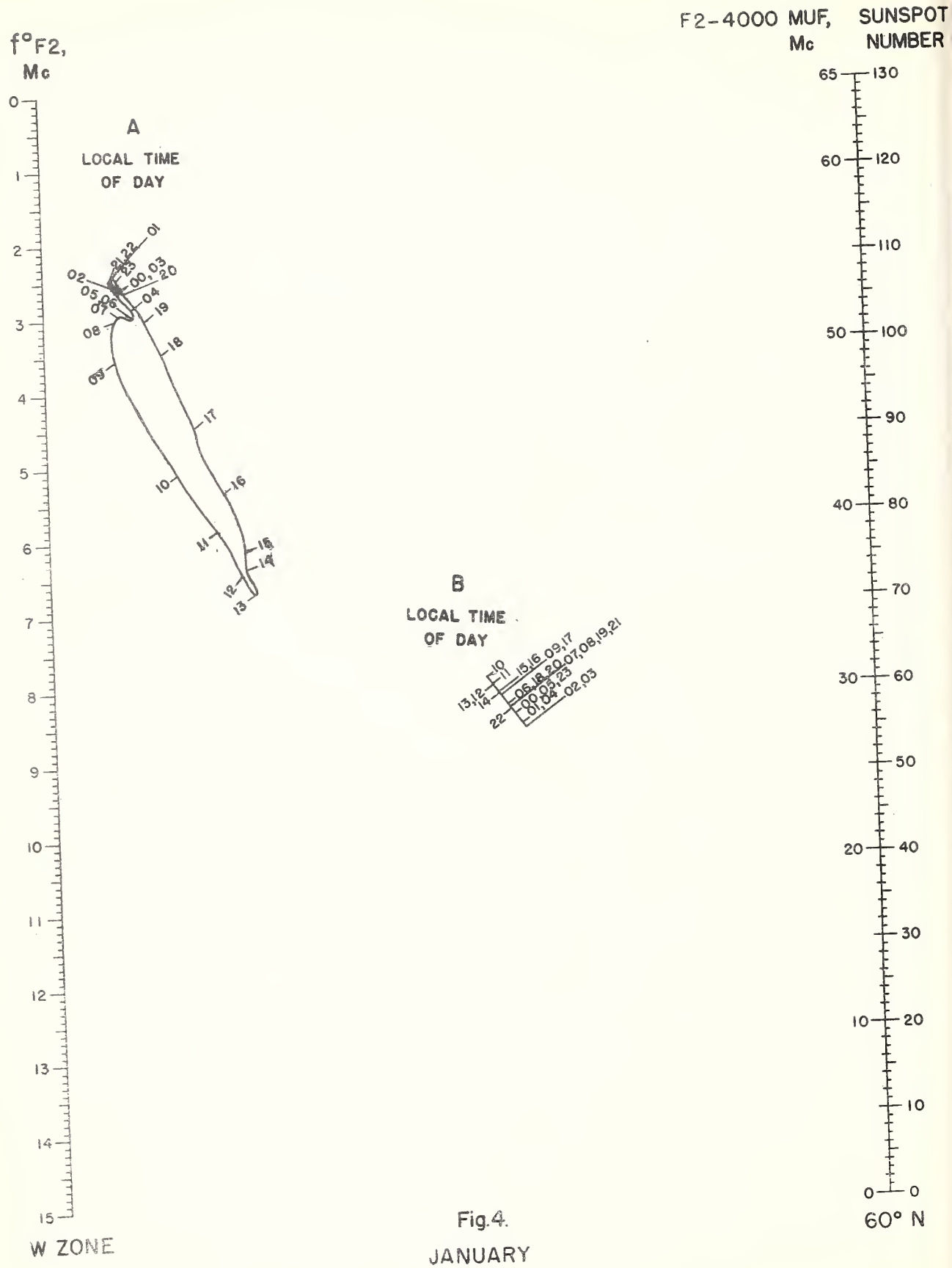

Fig.4.

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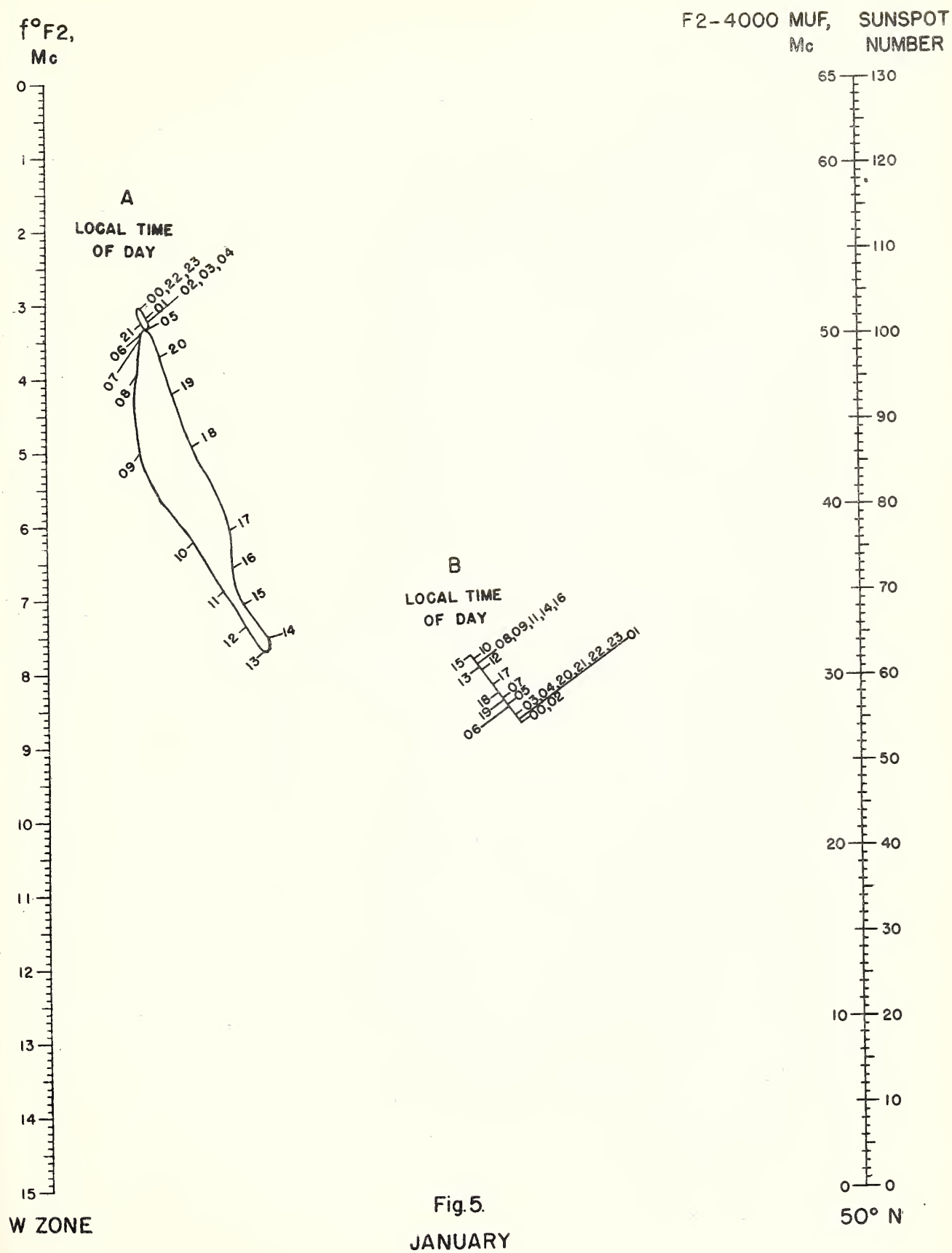

Fig. 5.

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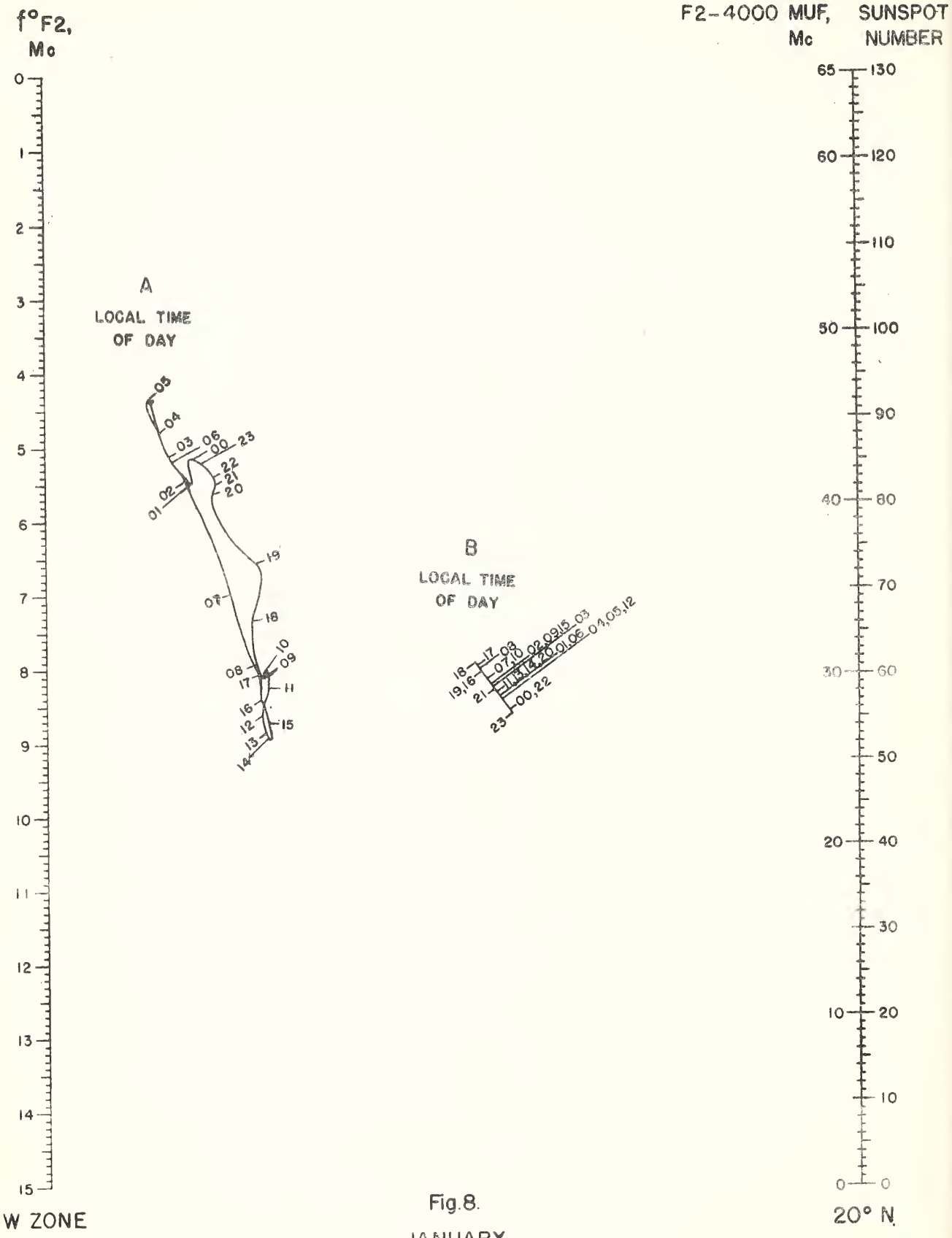

Fig.8.

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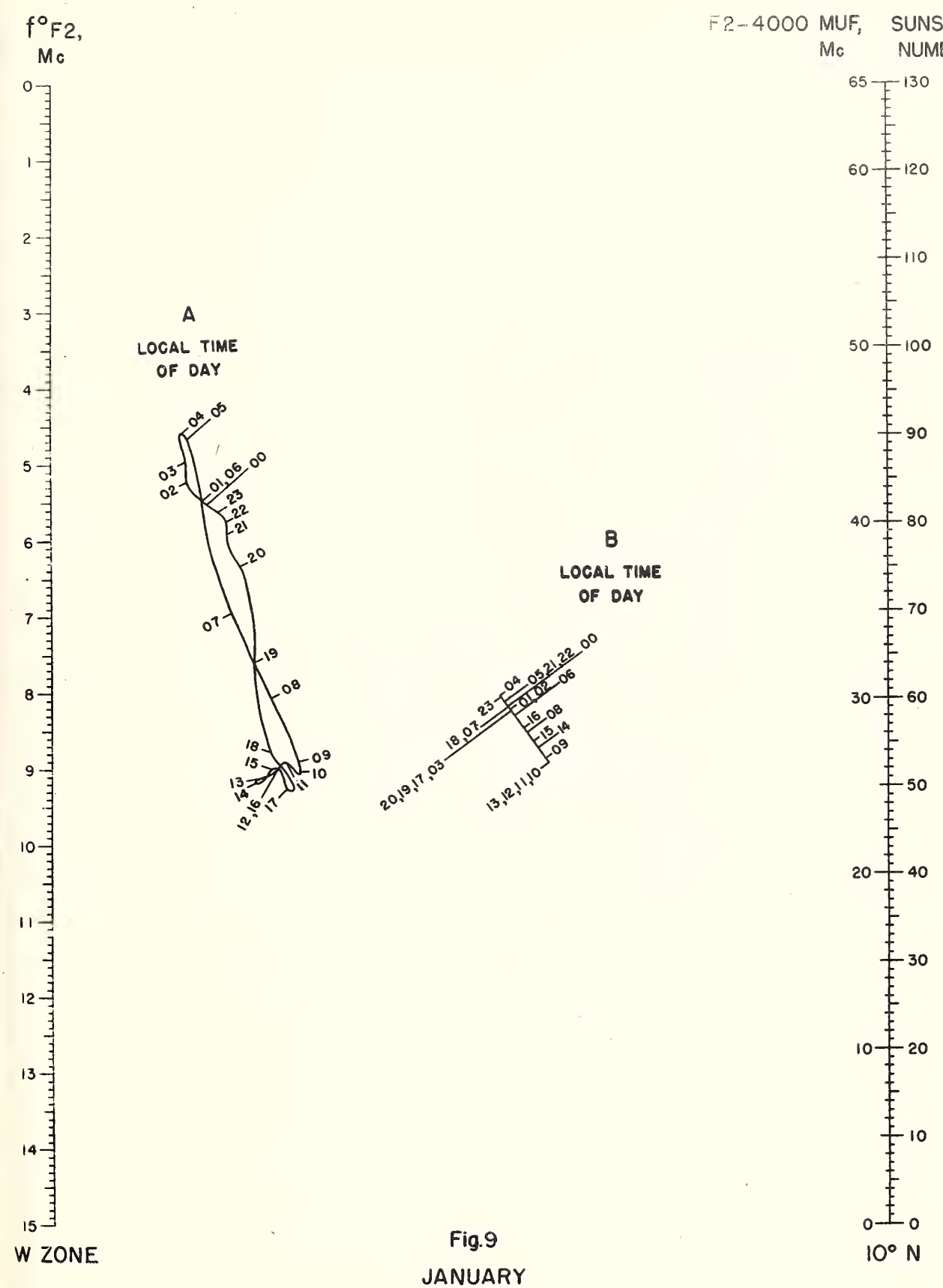

Fig.9

JANUARY

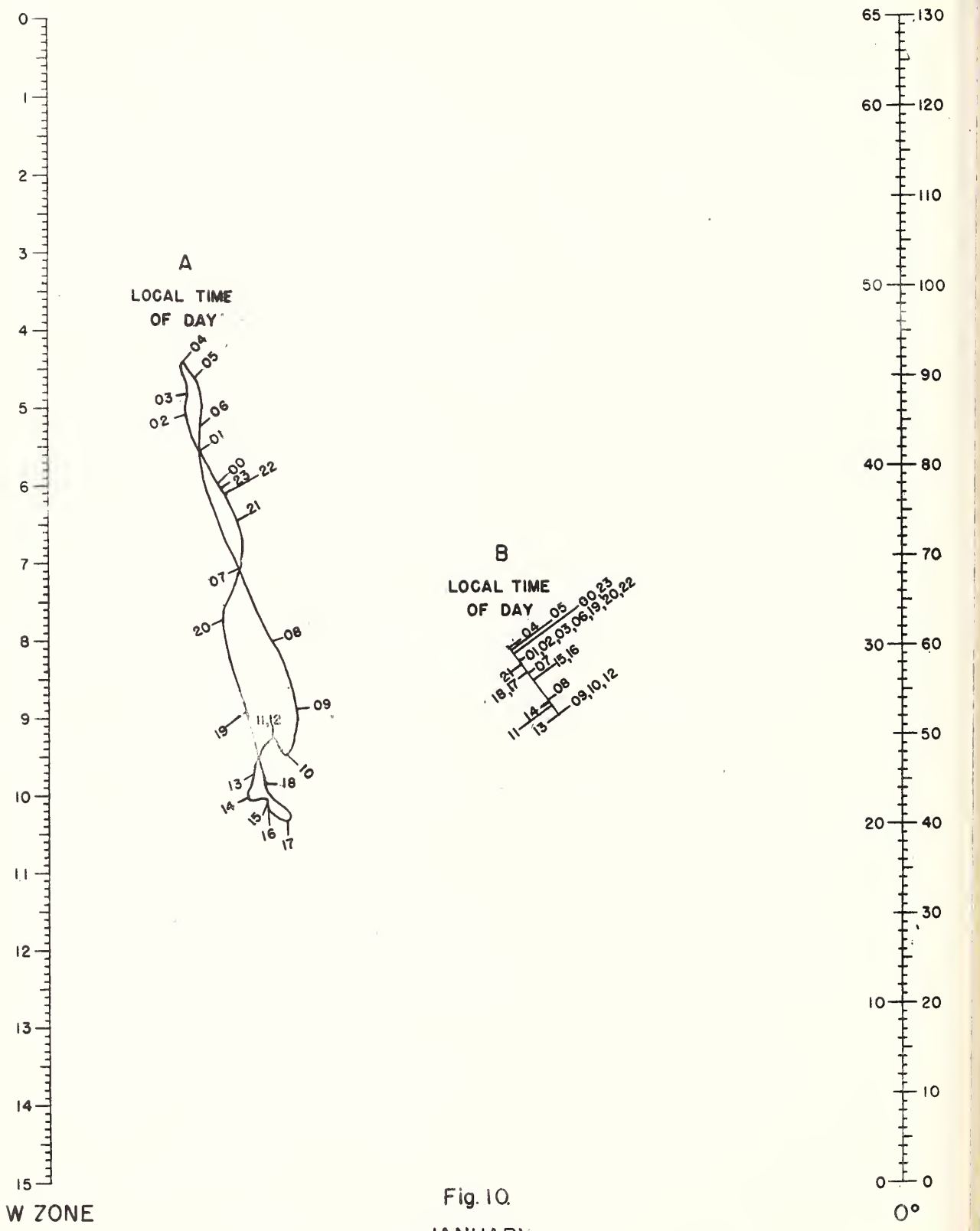

Fig. 10.

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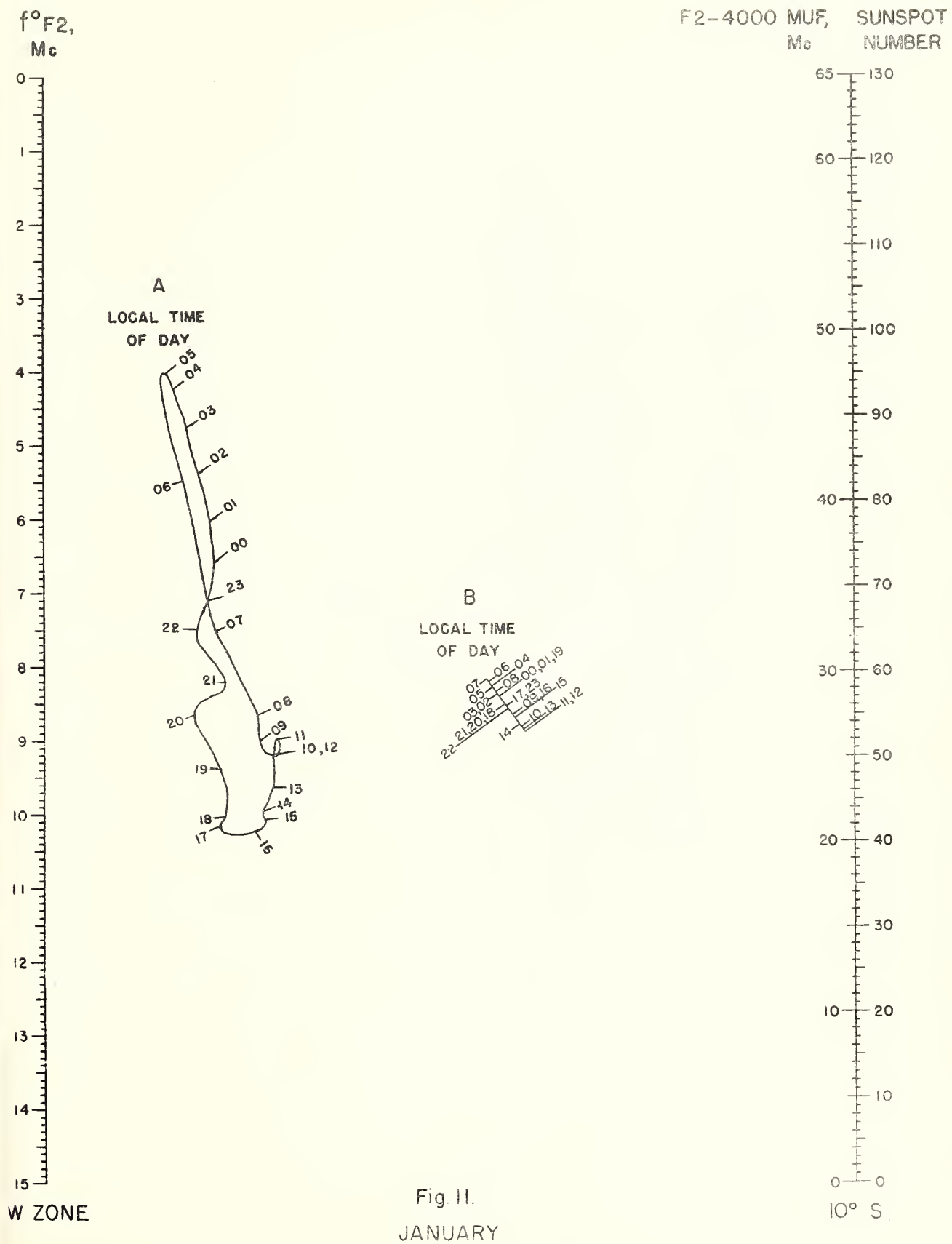

Fig. 11.

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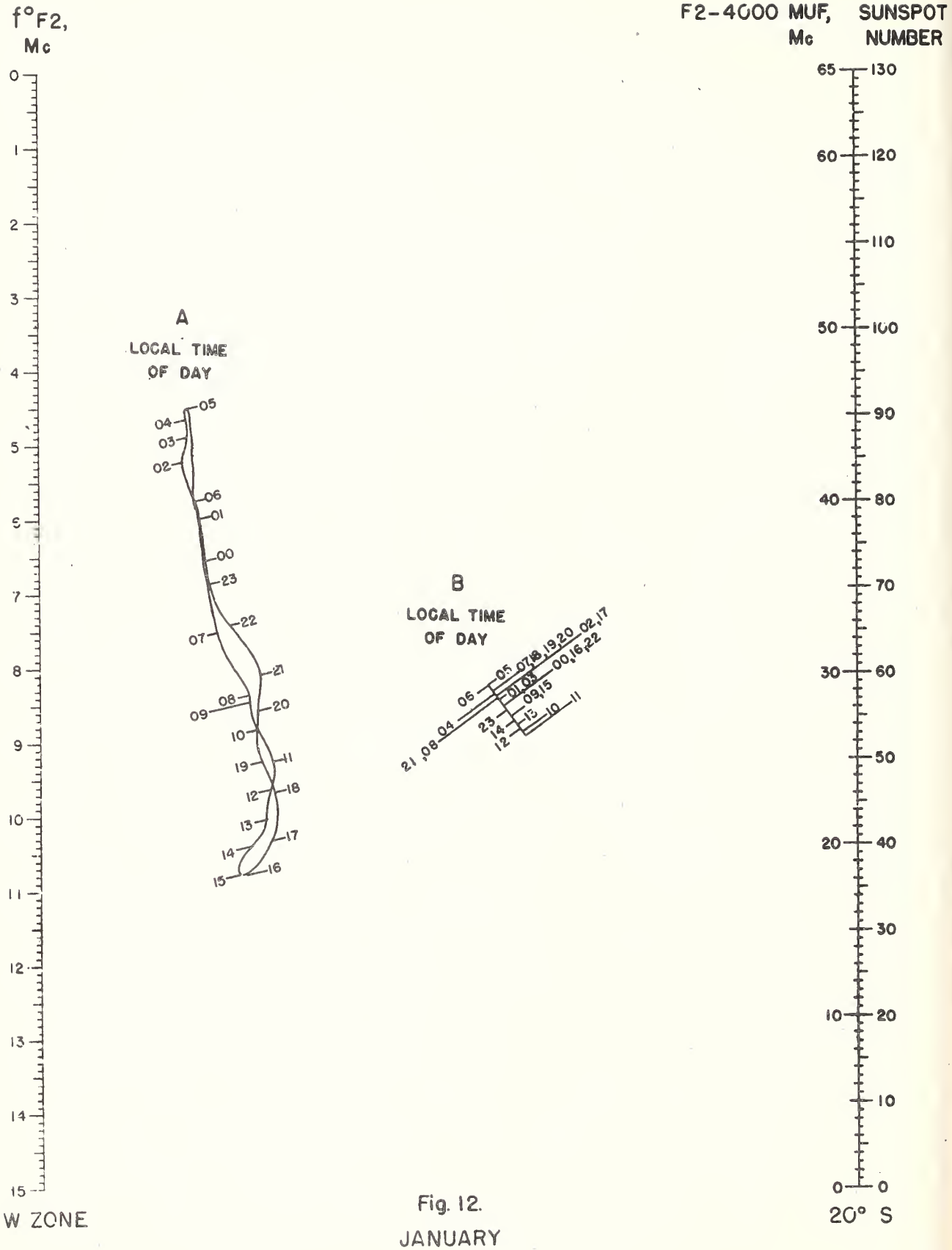

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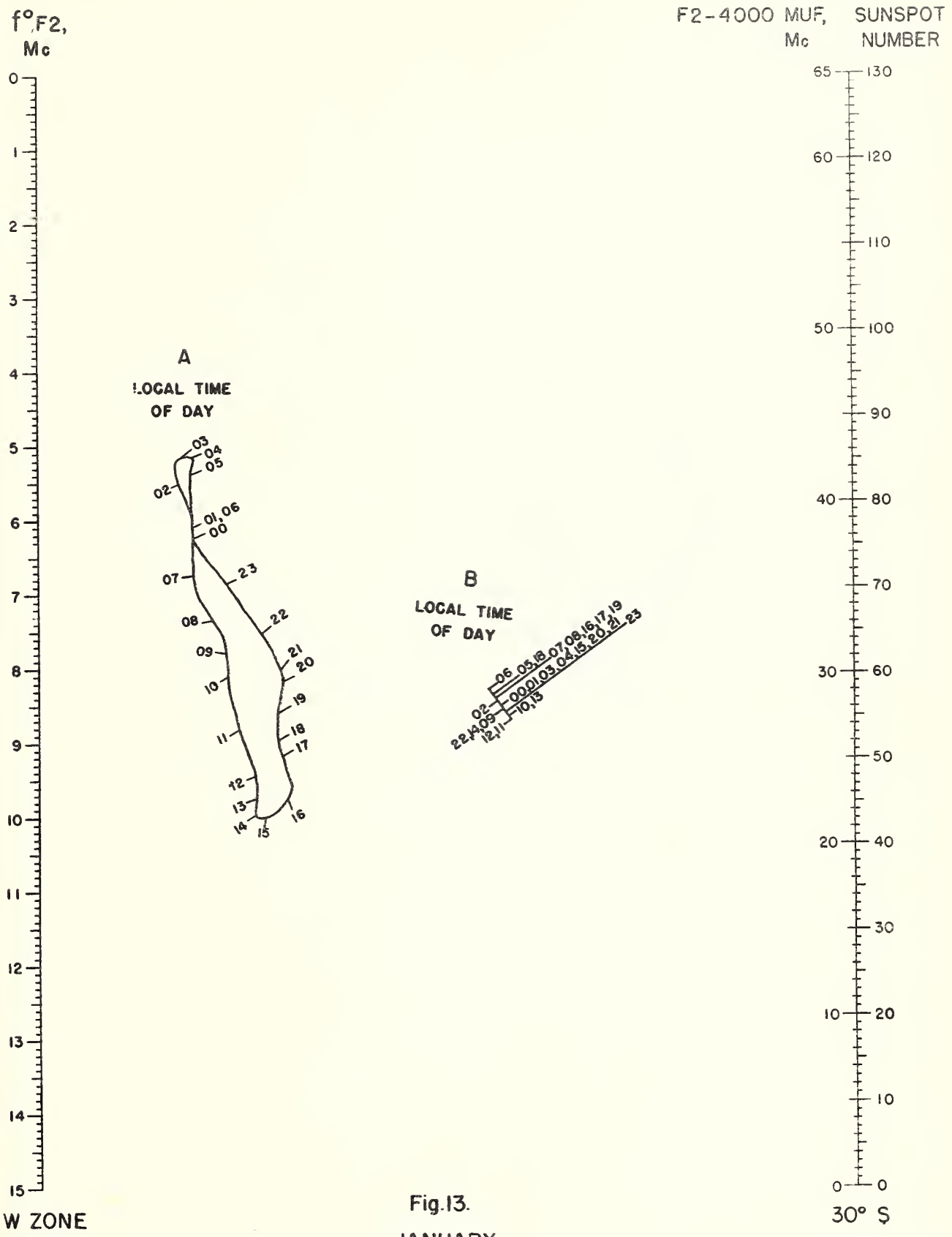

Fig.13.

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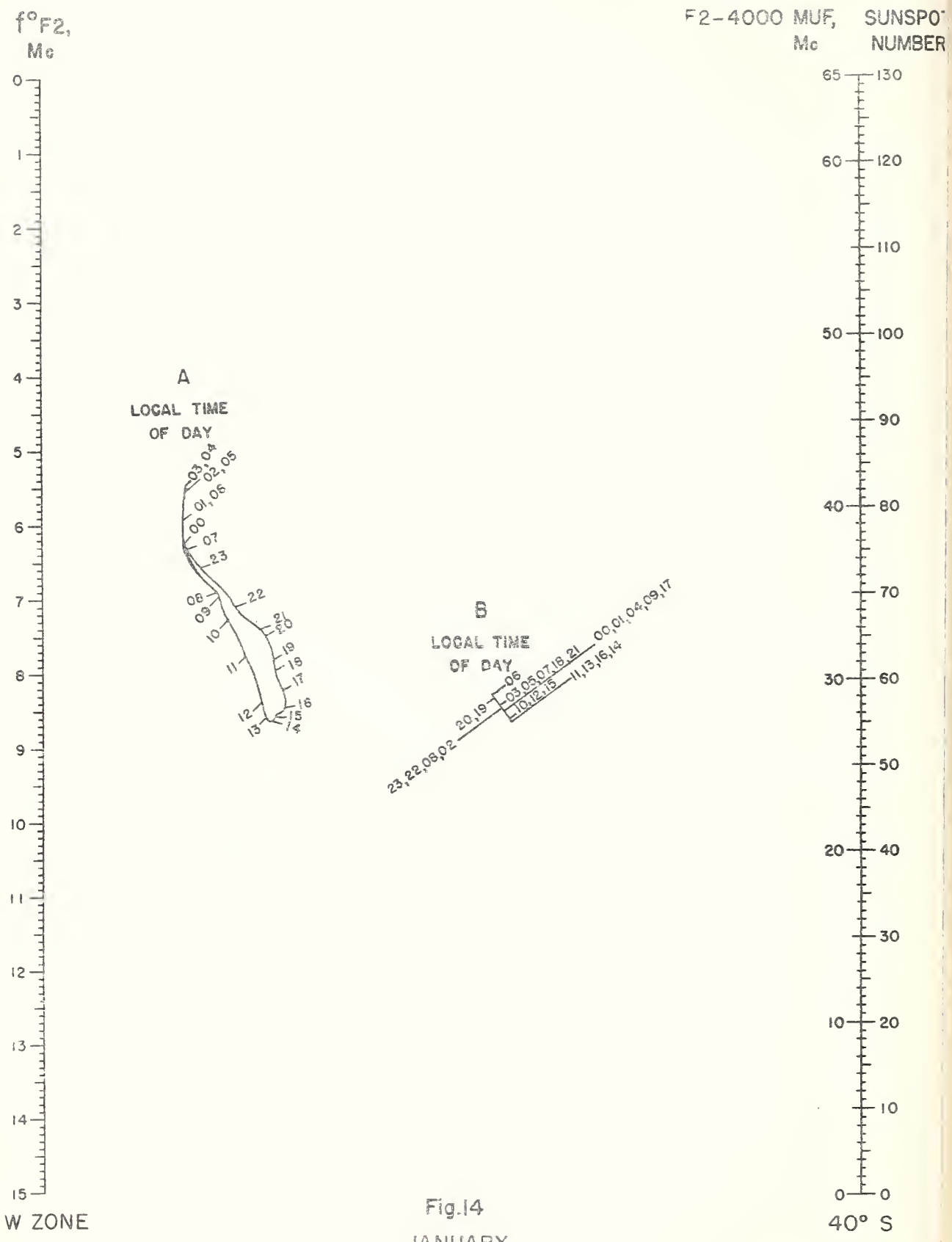

Fig.14

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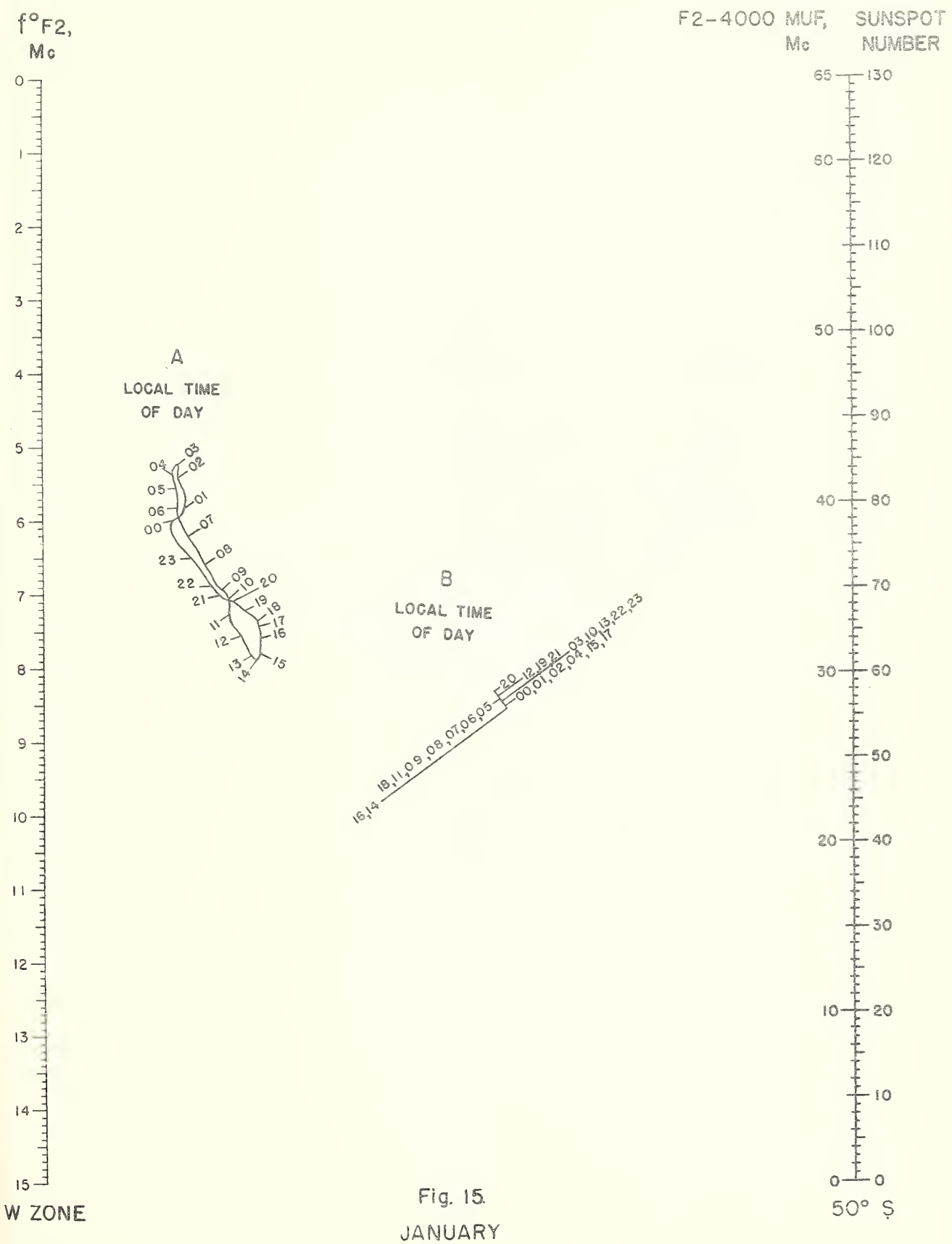

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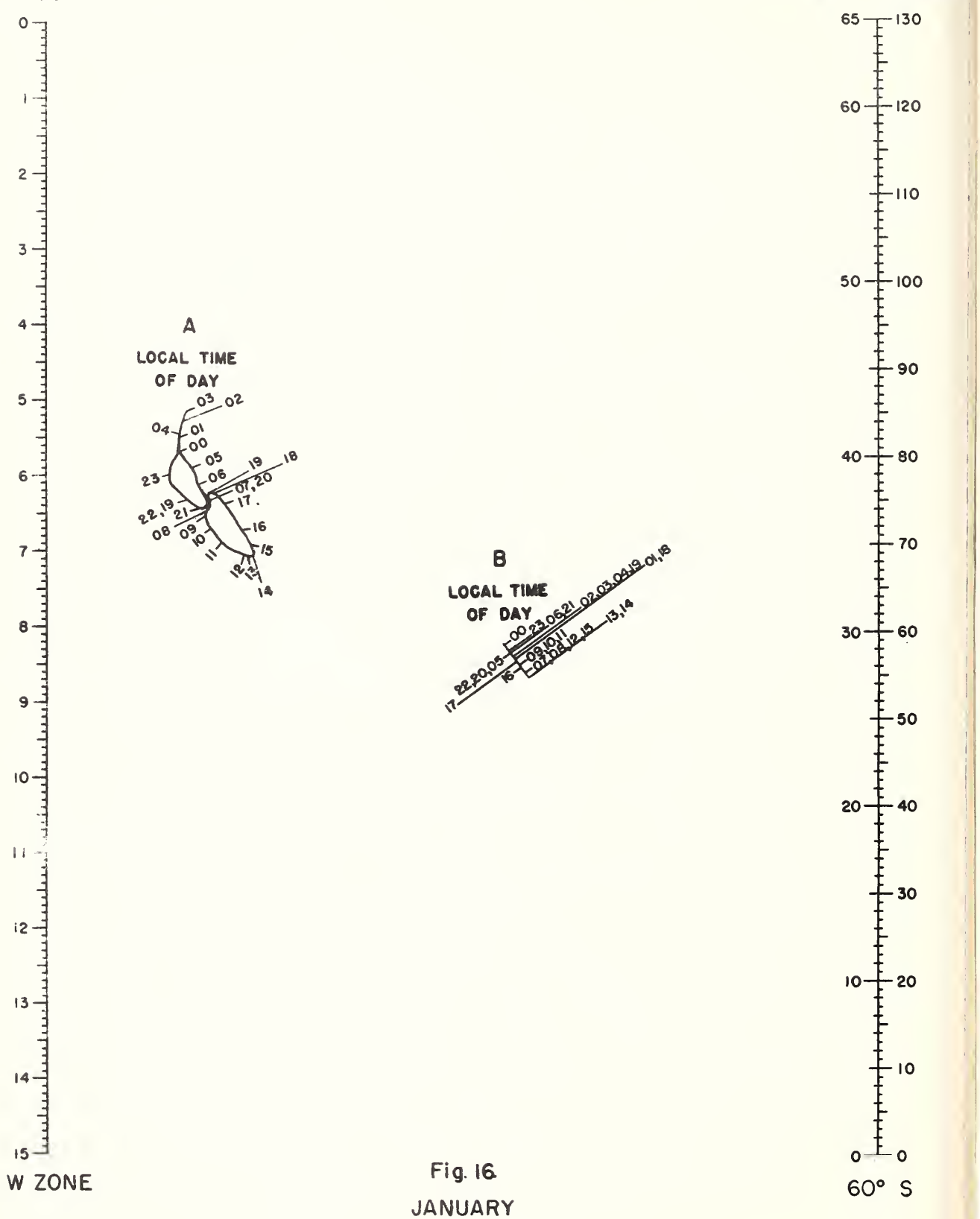

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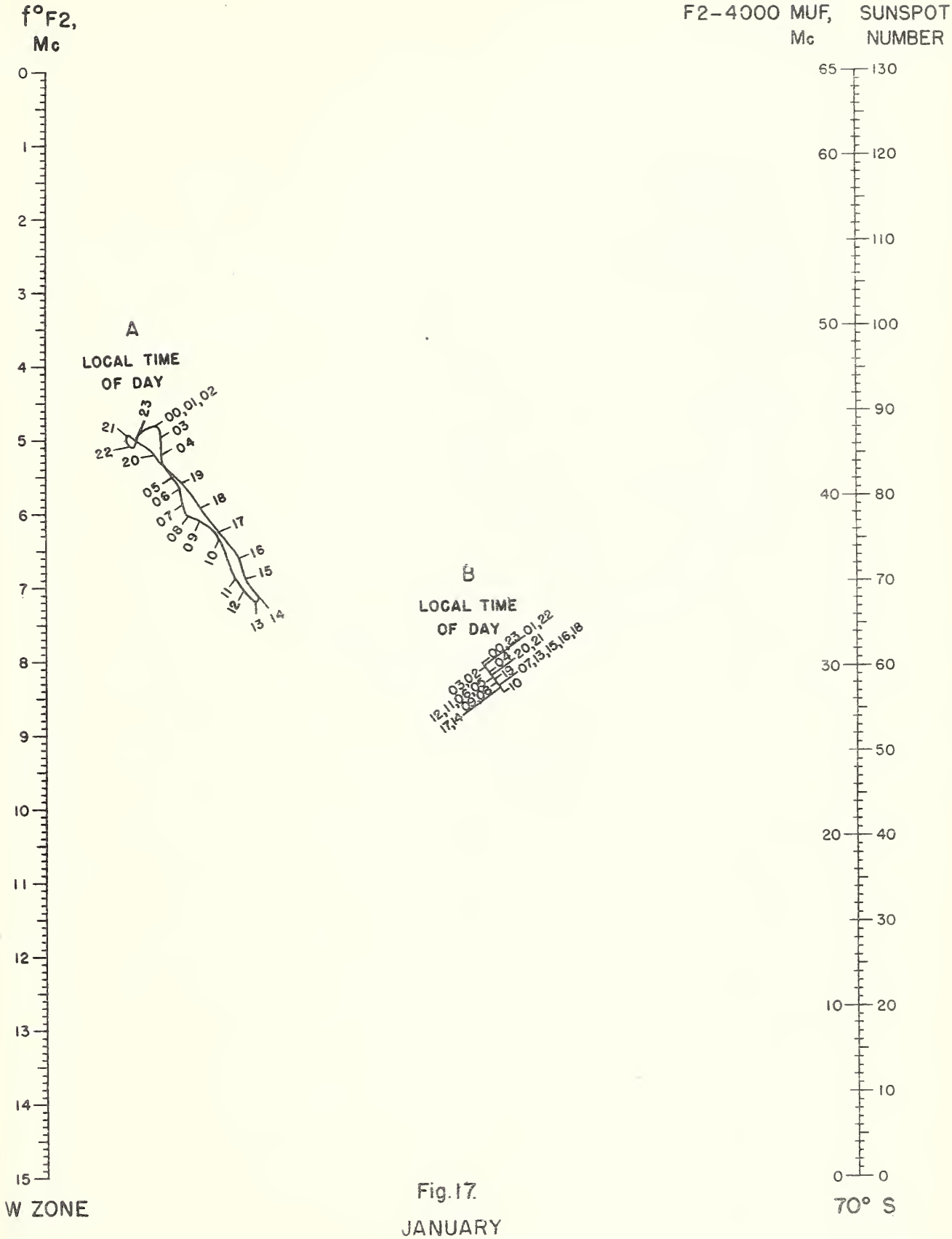

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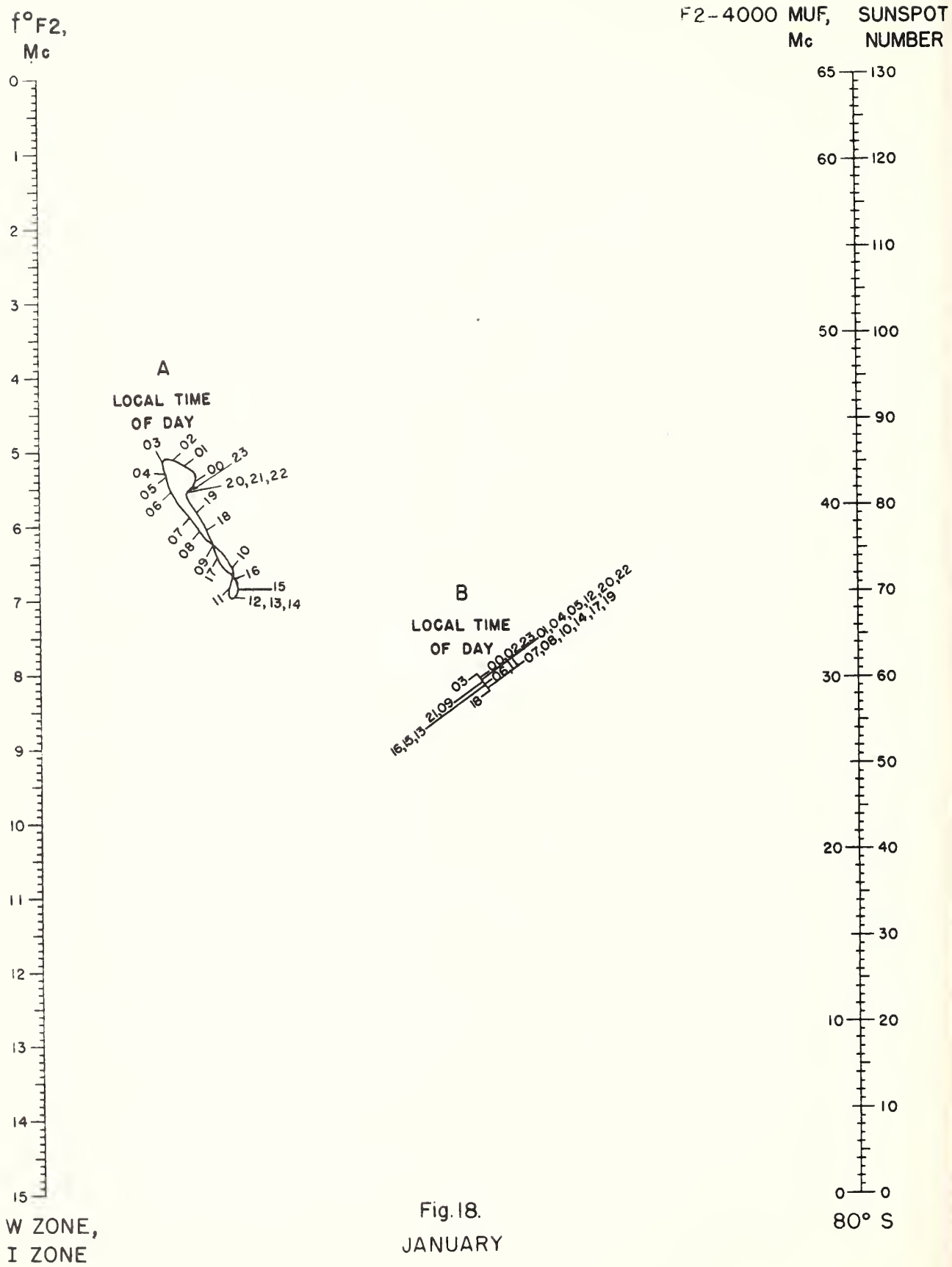

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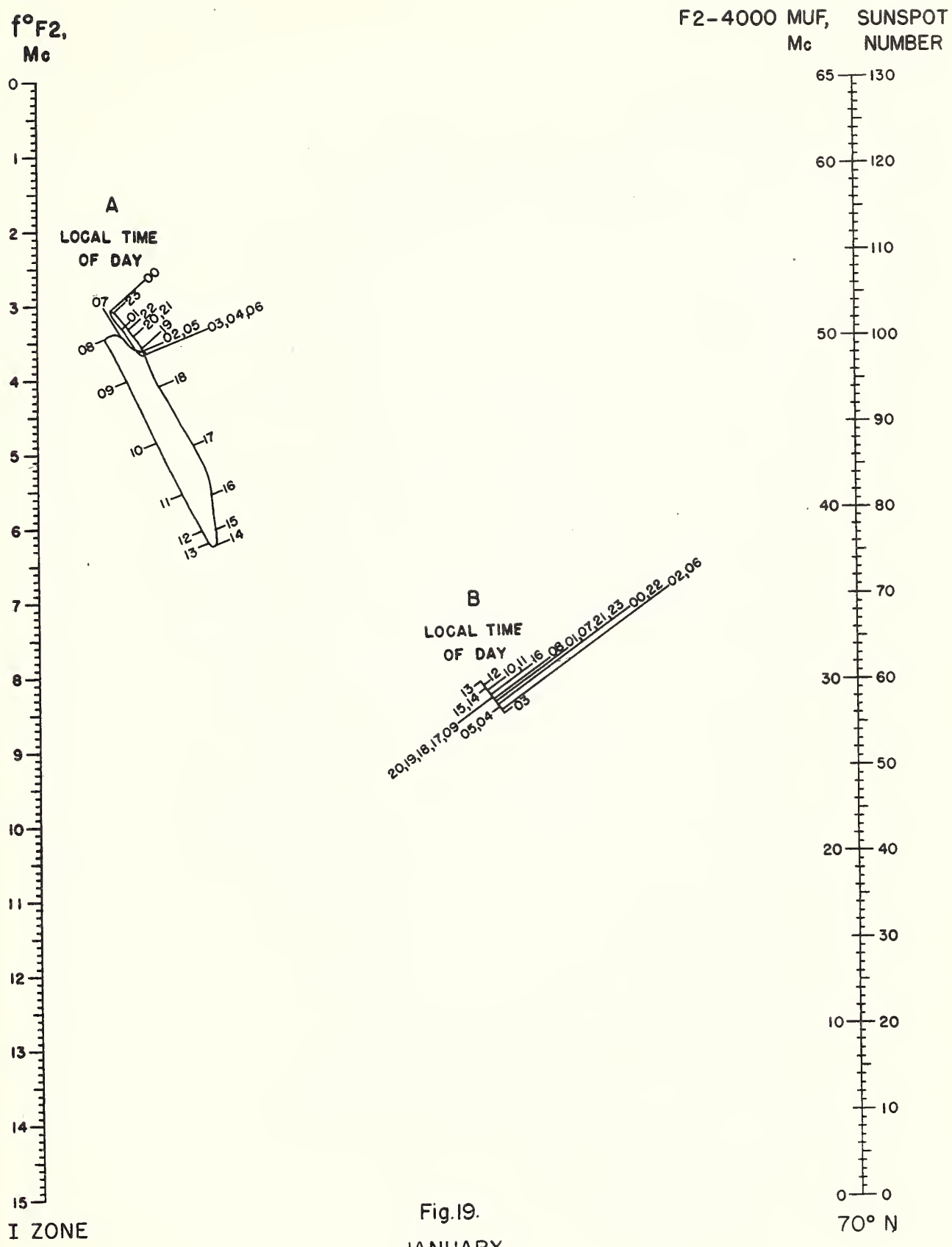

Fig.19.

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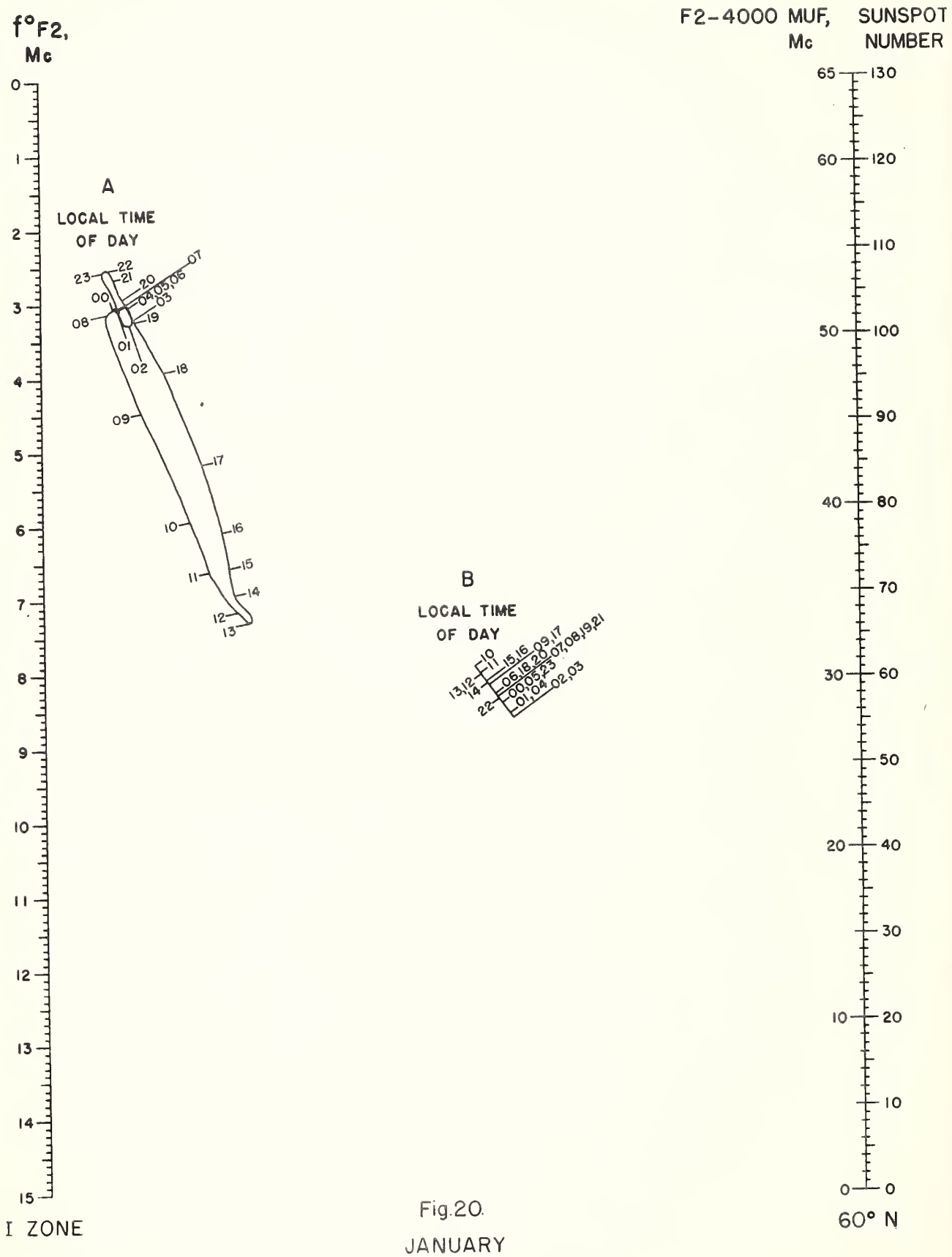

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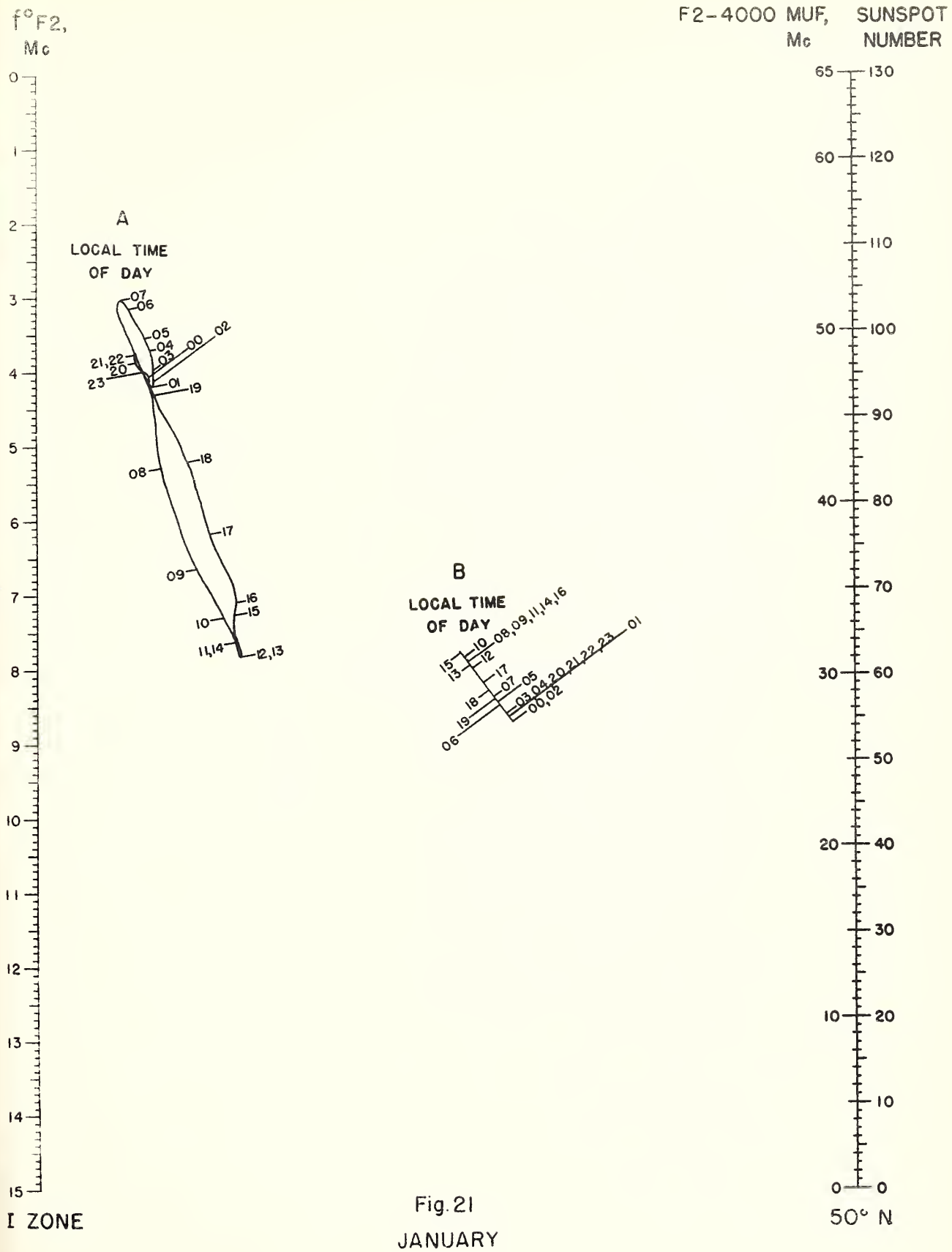

Fig. 21

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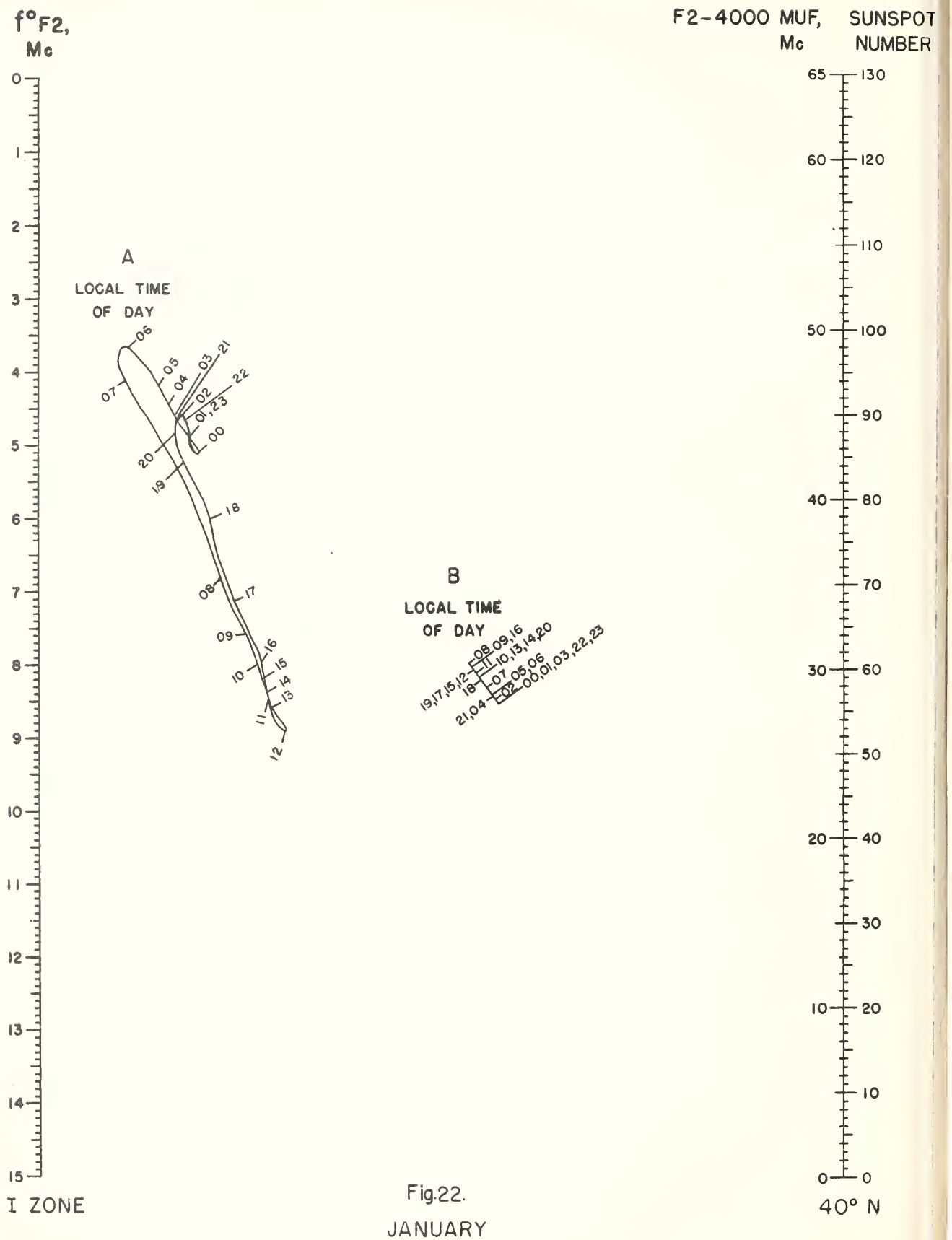

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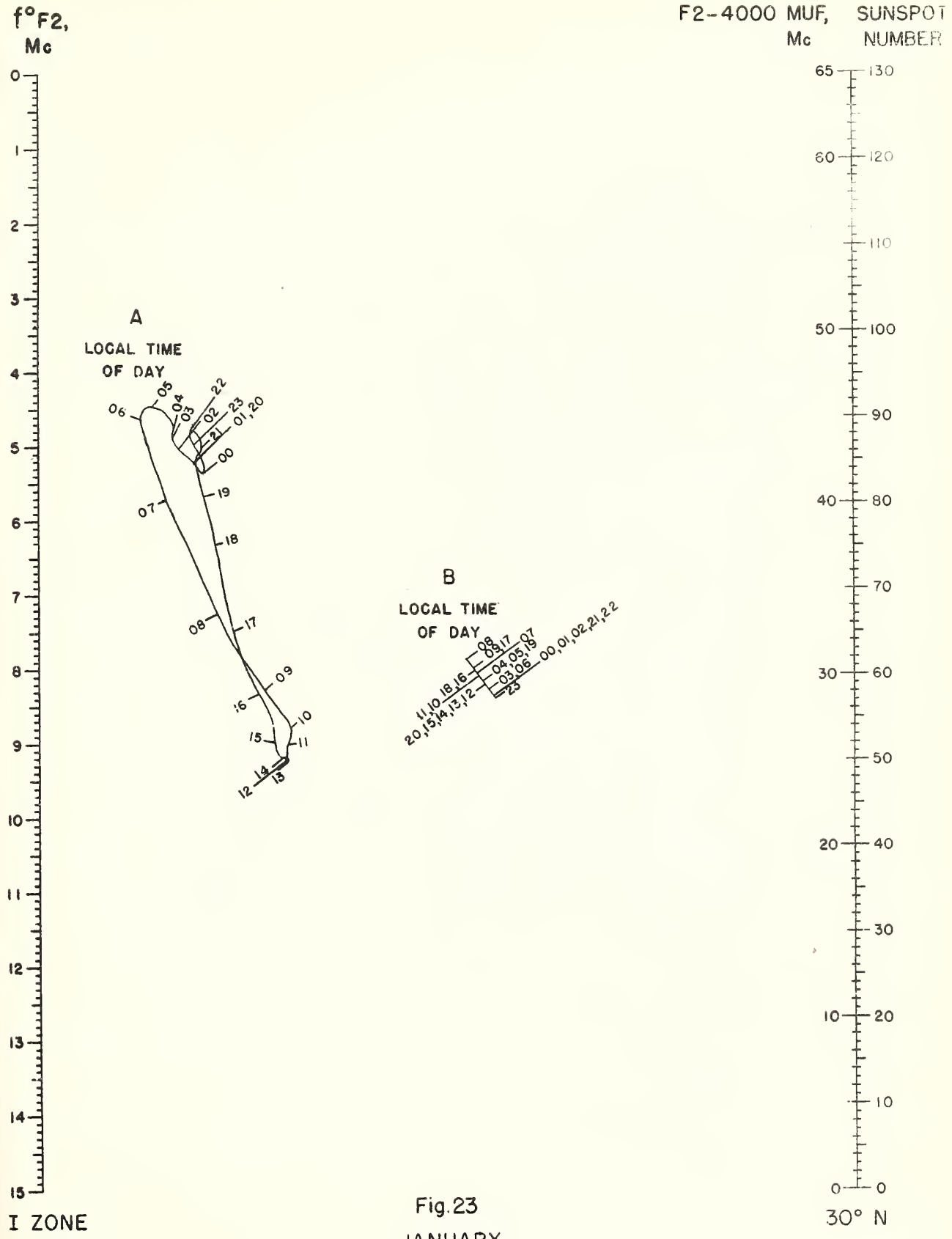

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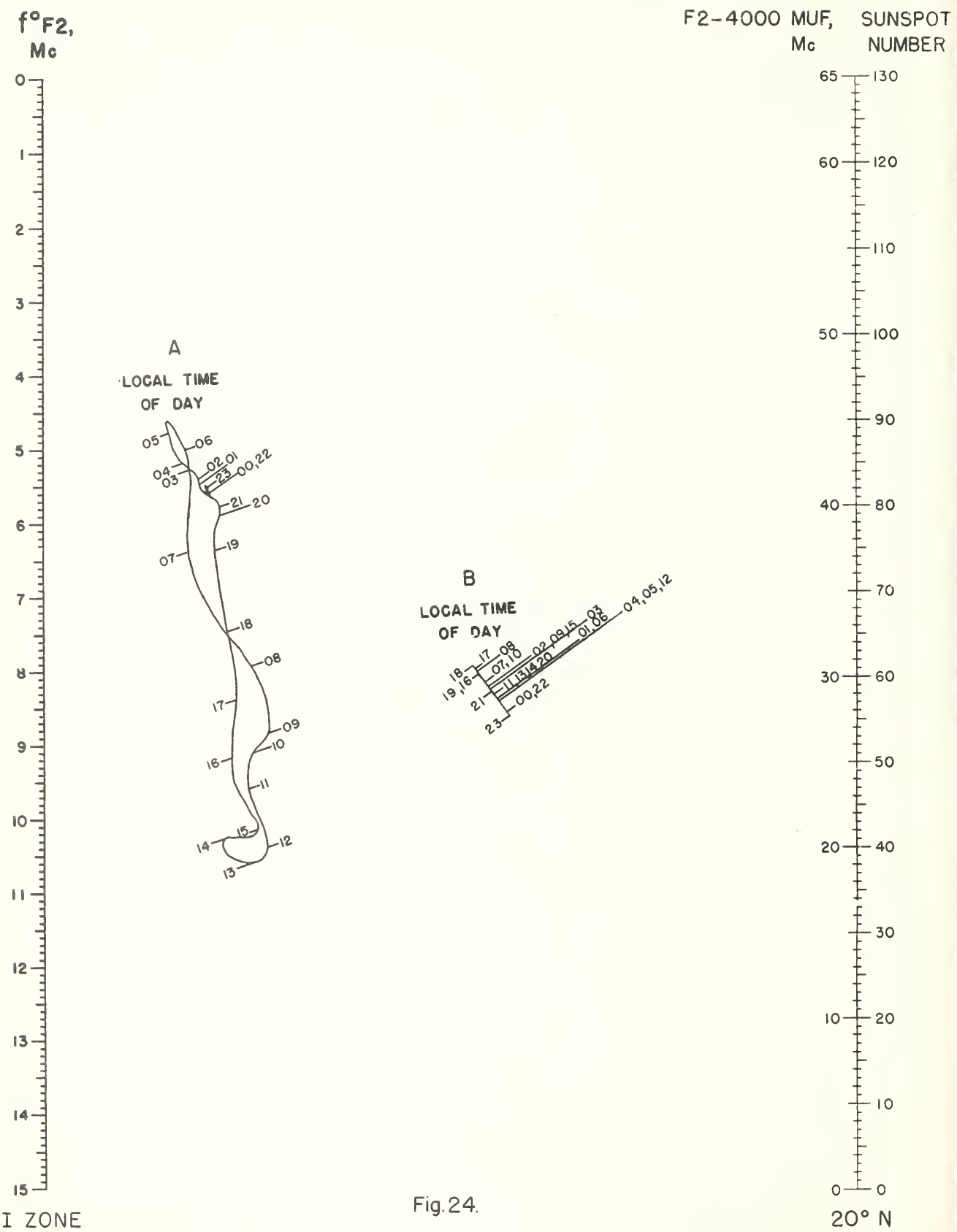

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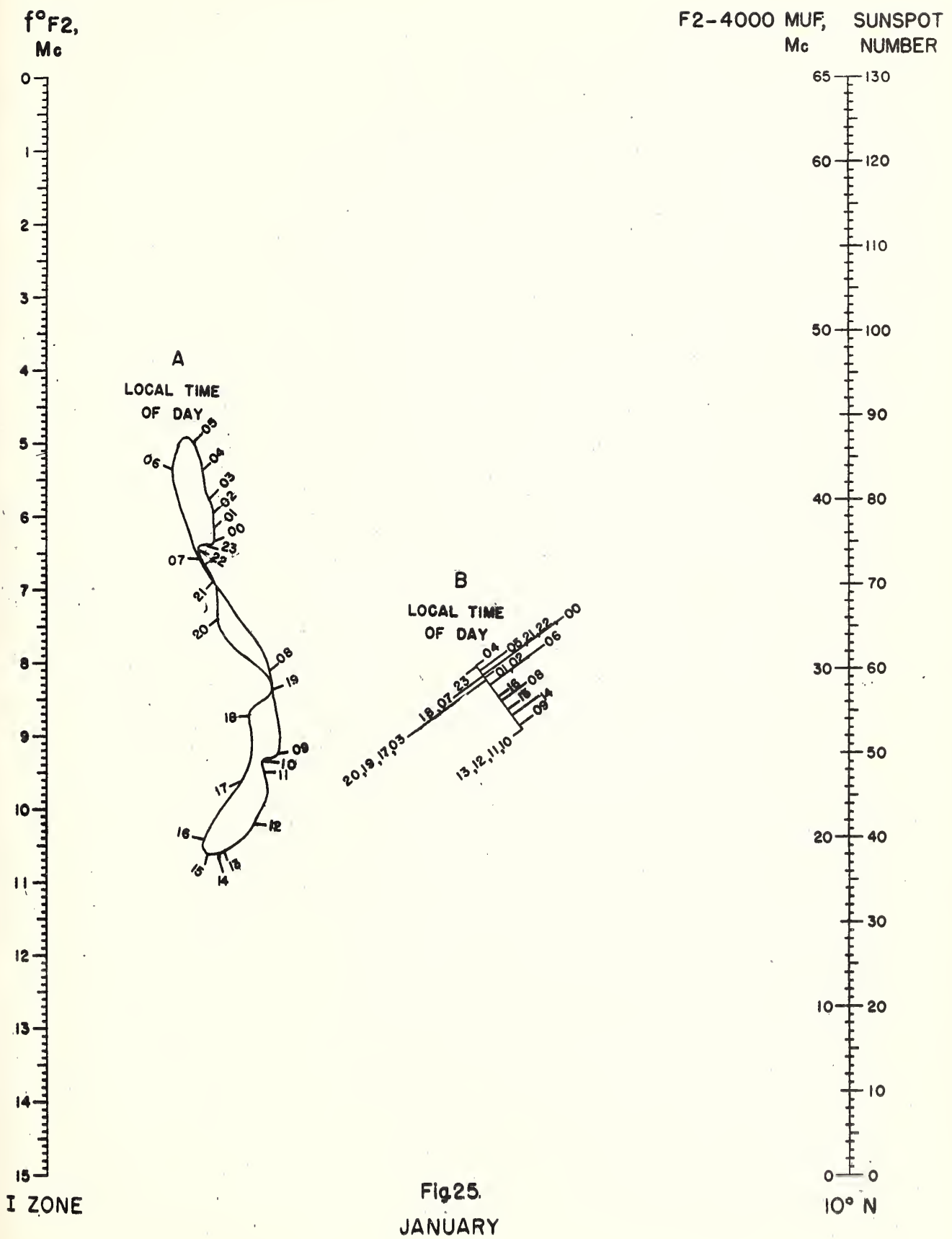

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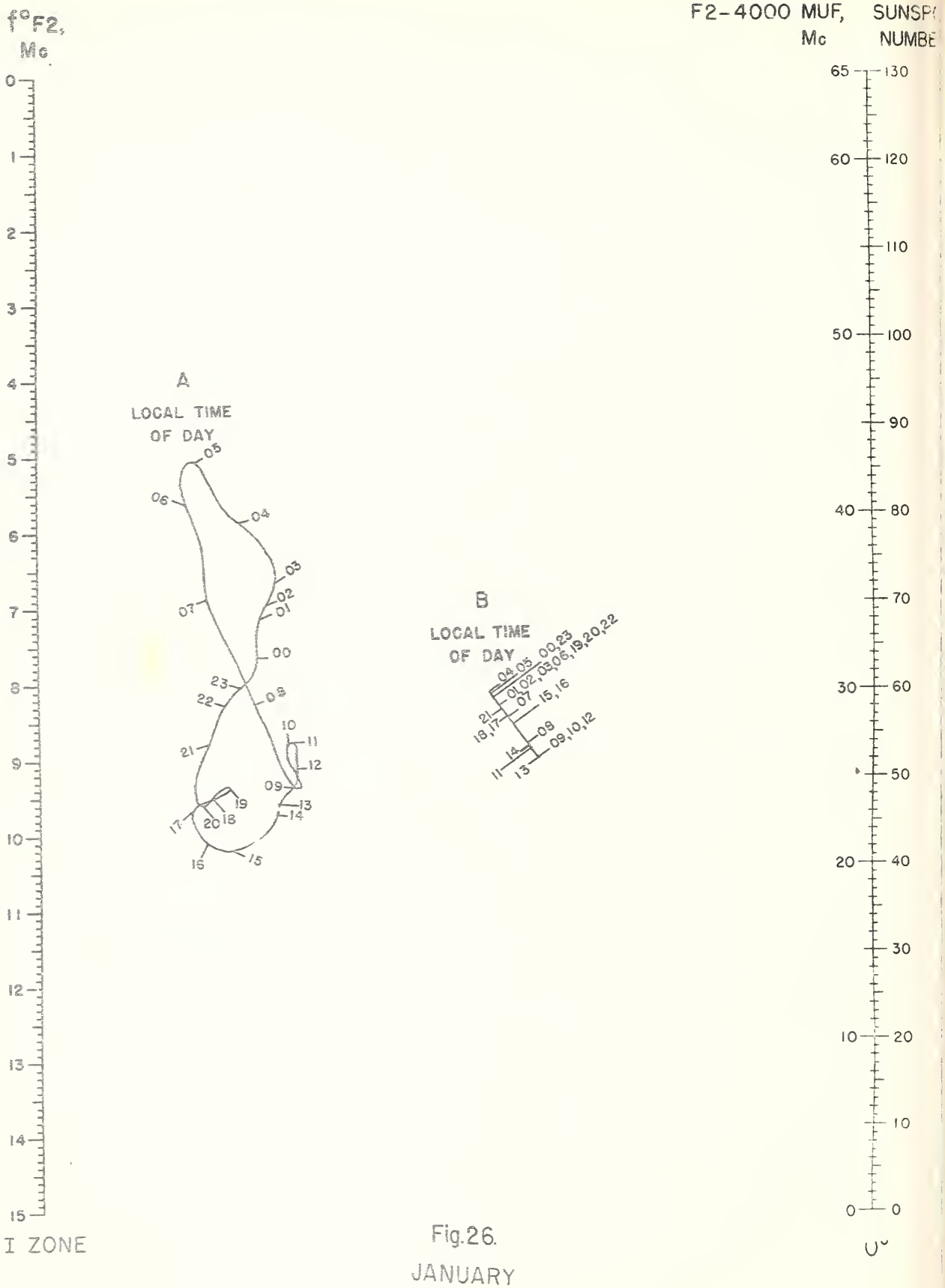

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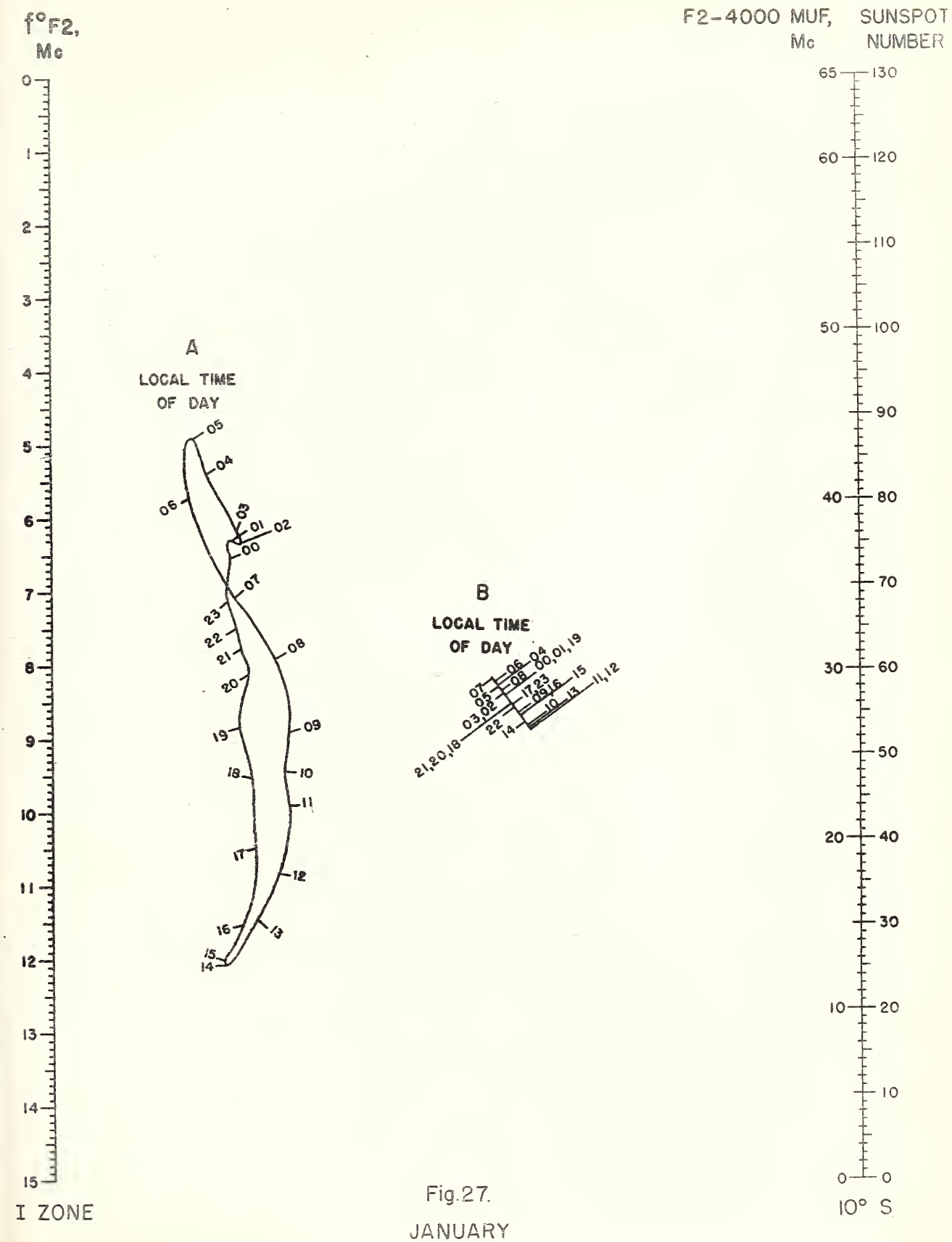

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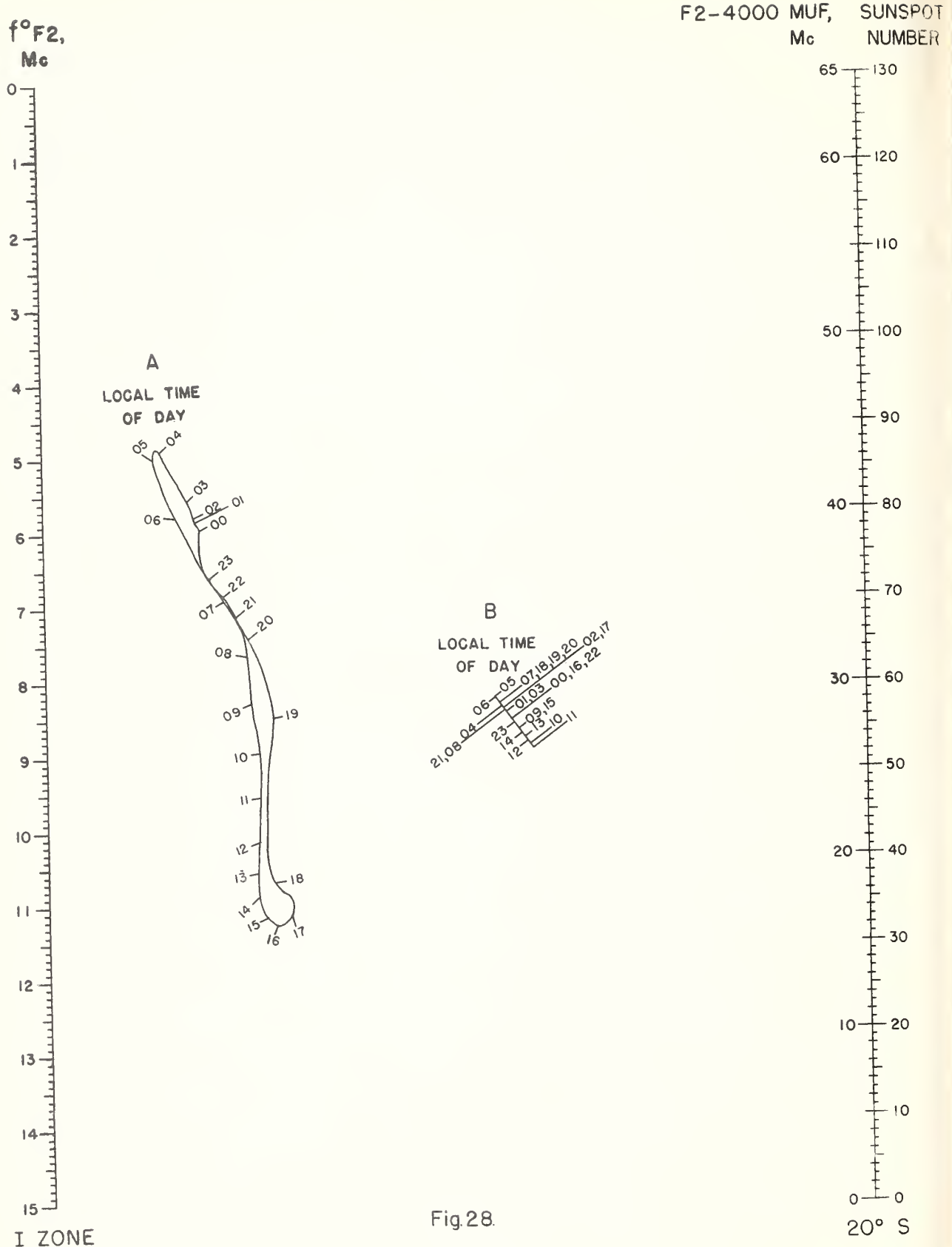

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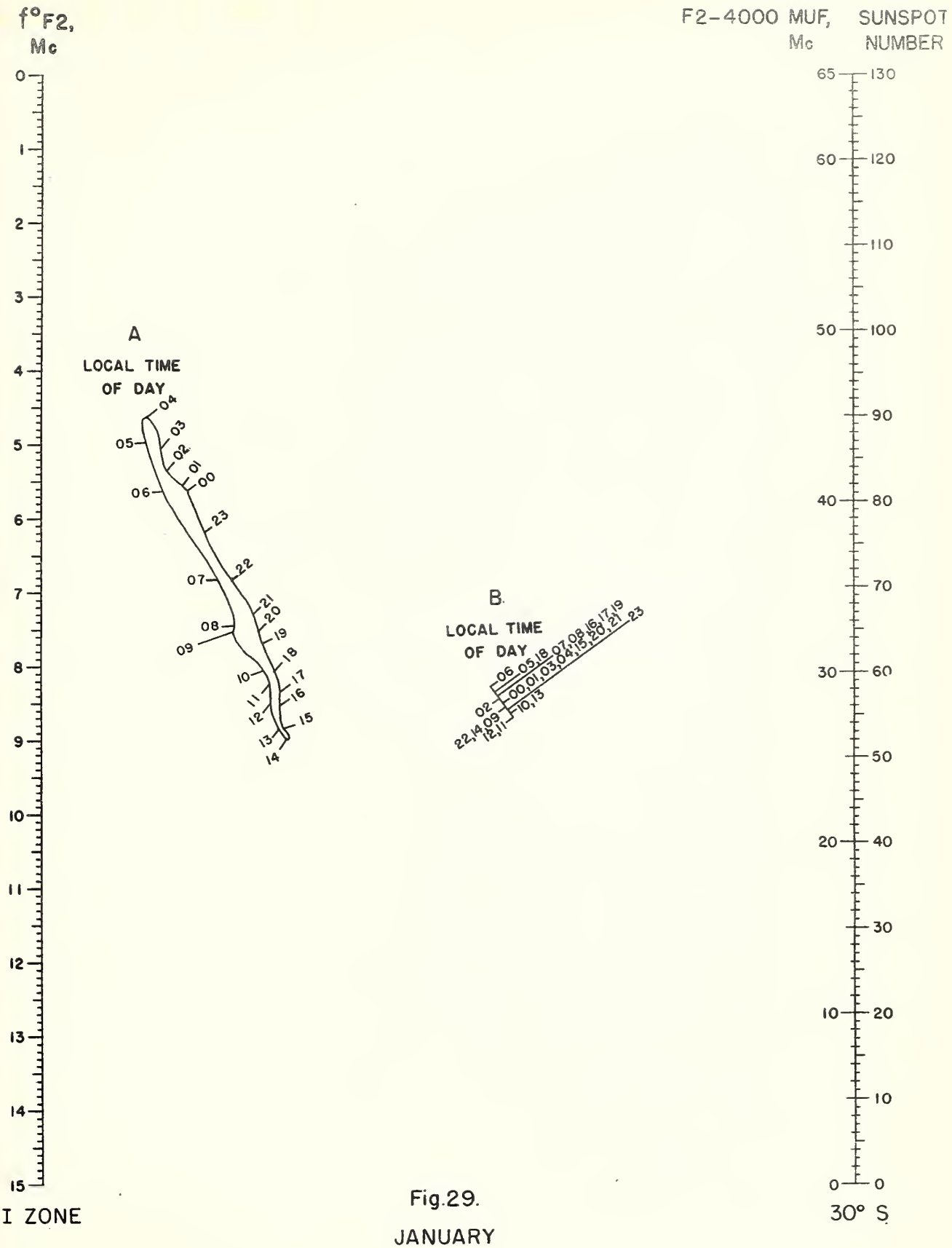

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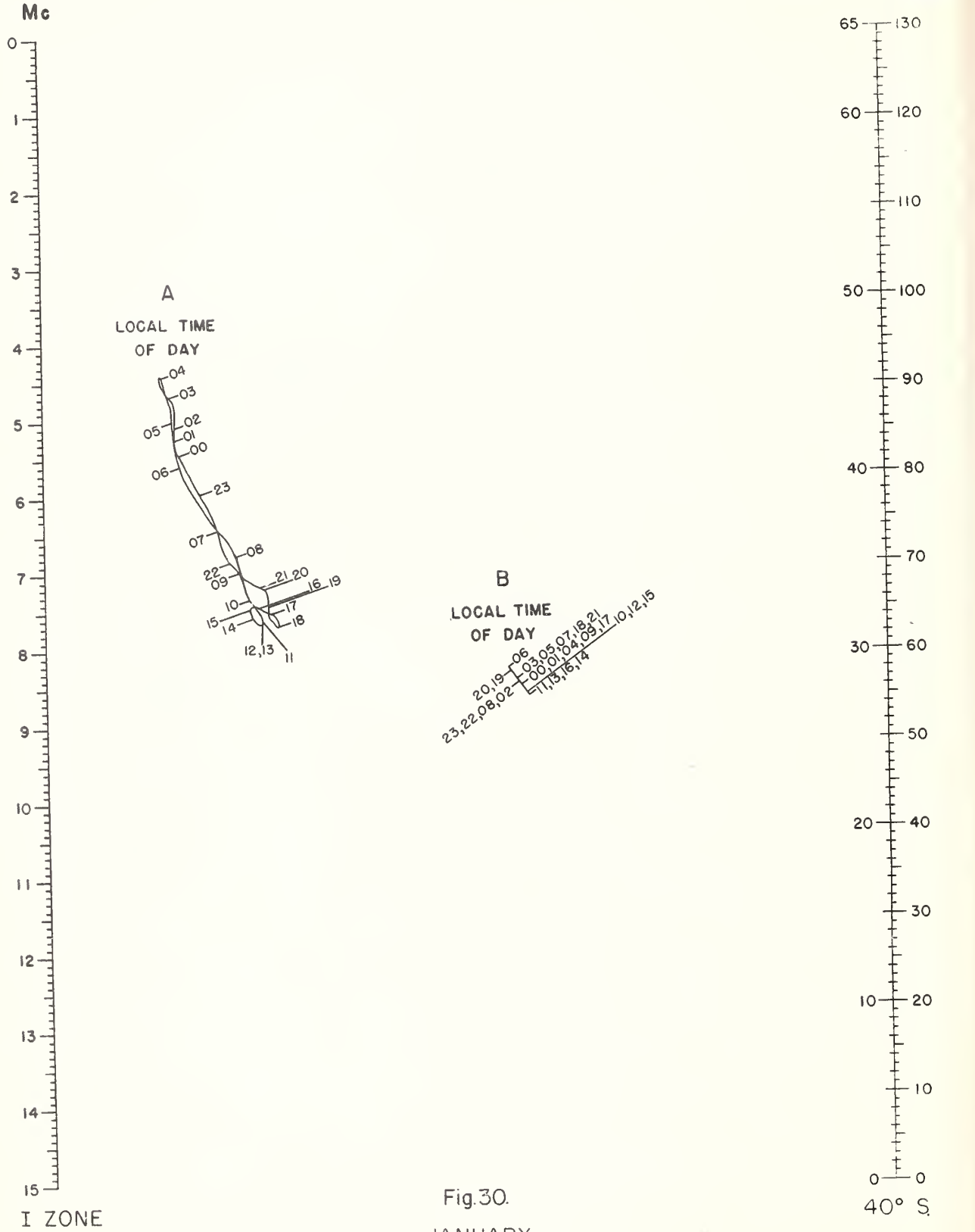

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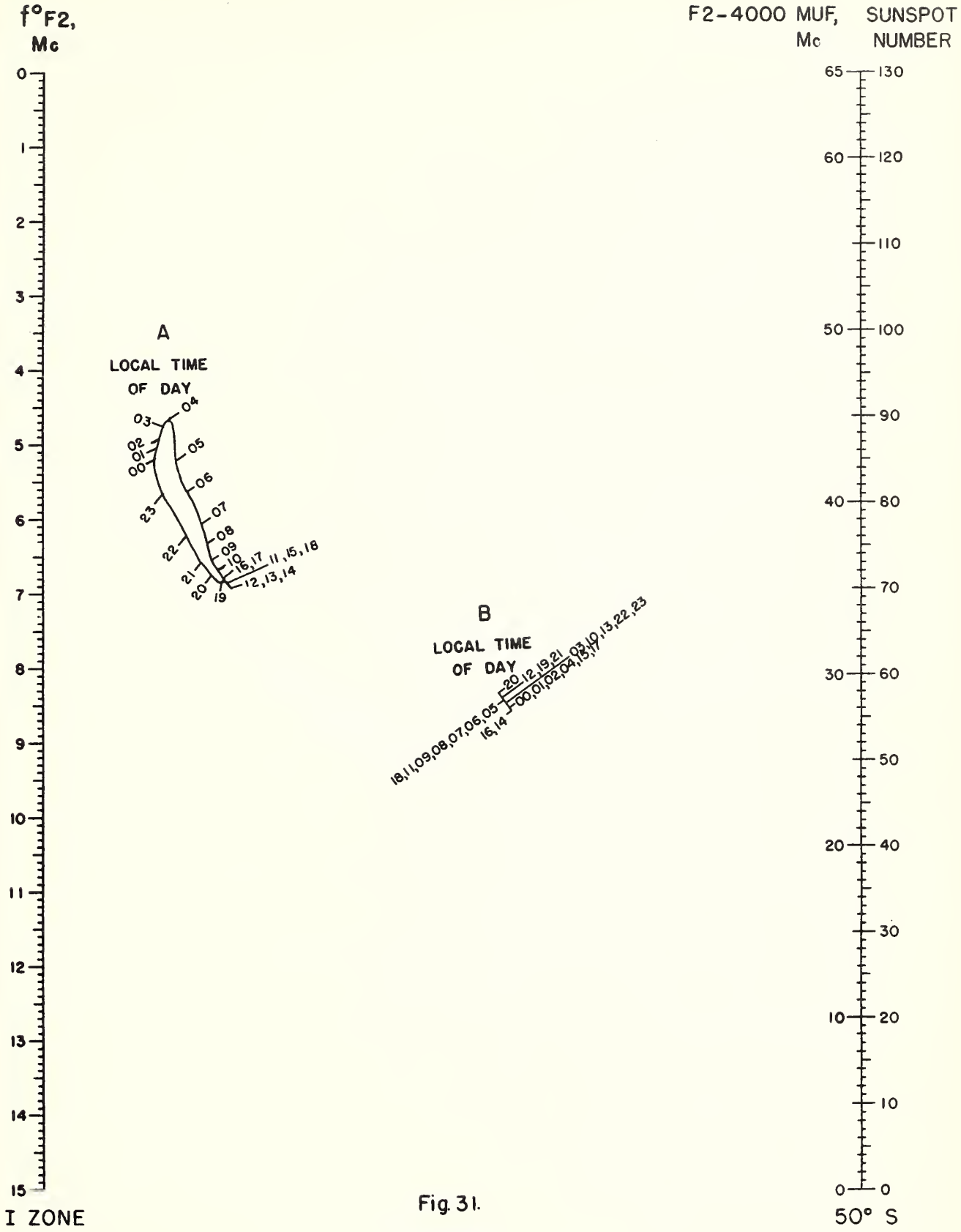

Fig. 31.

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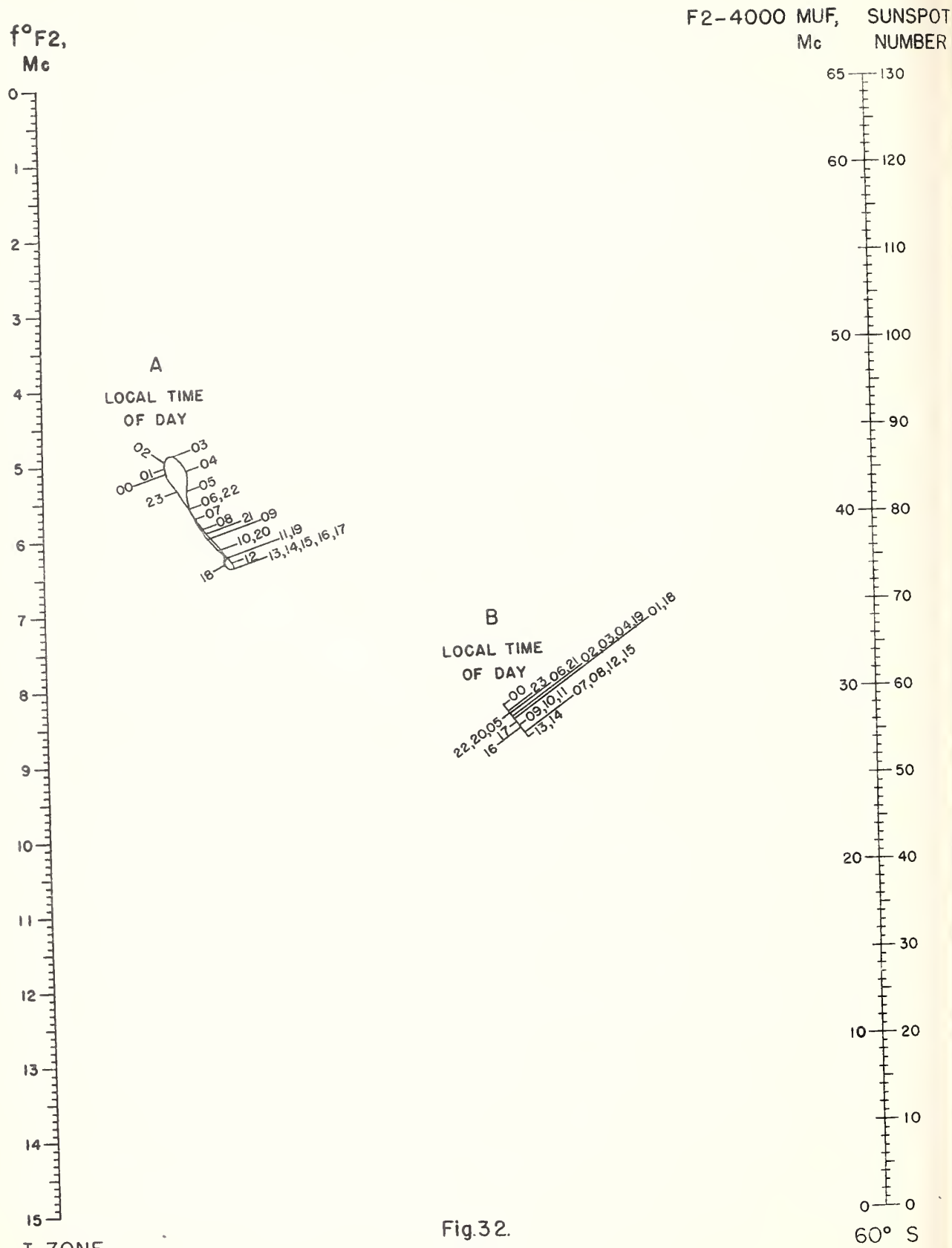

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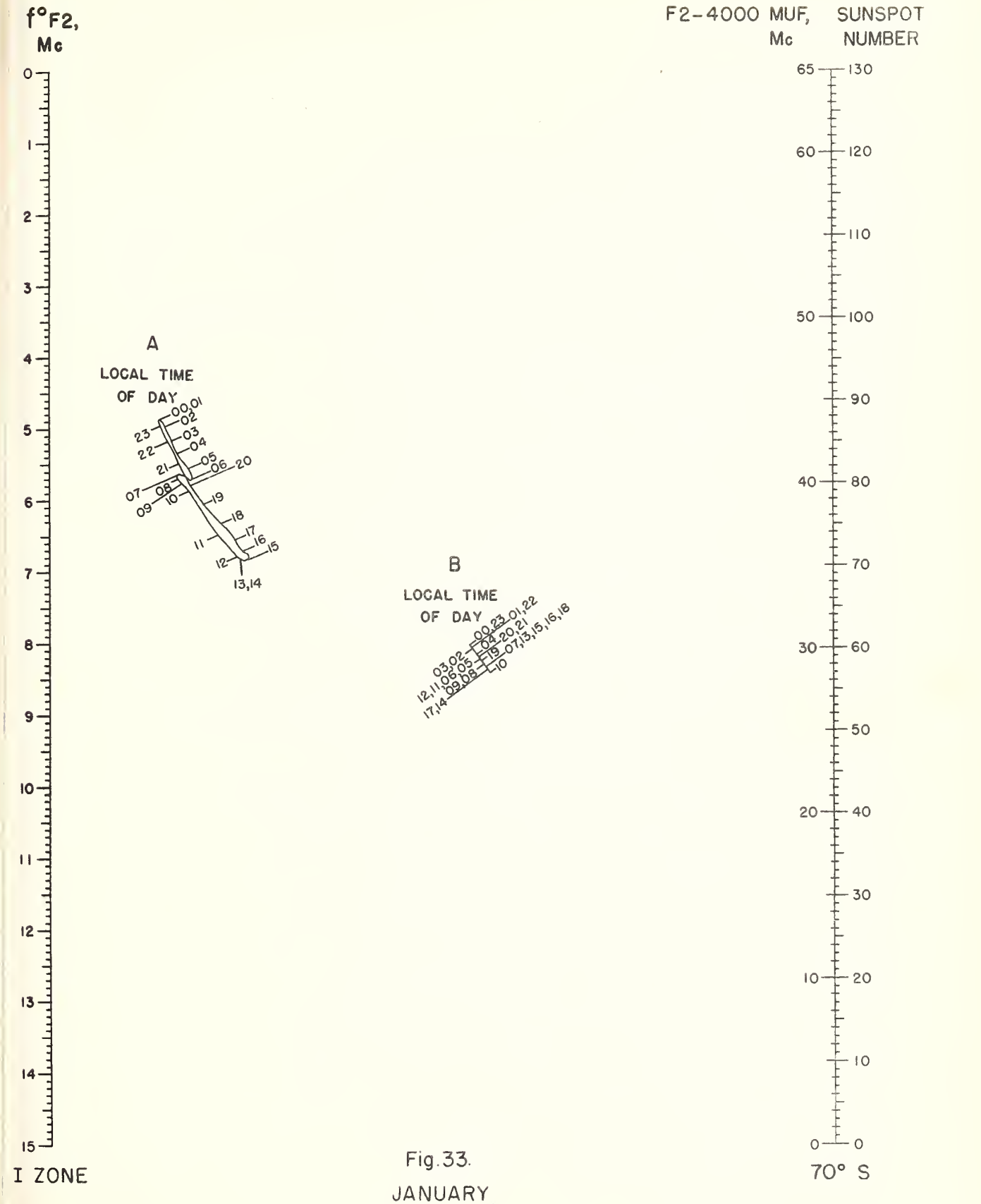

Fig. 33.
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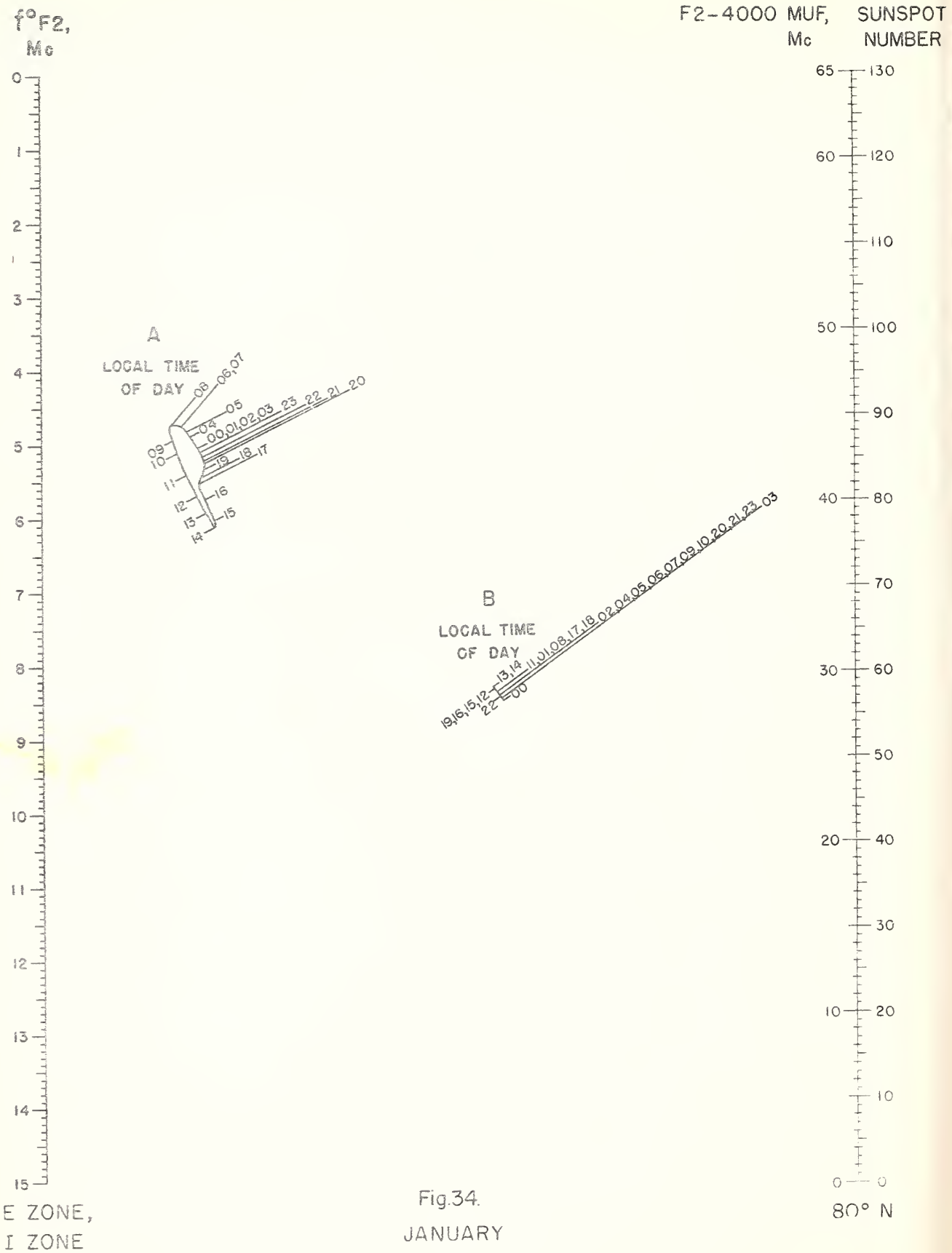

Fig.34.

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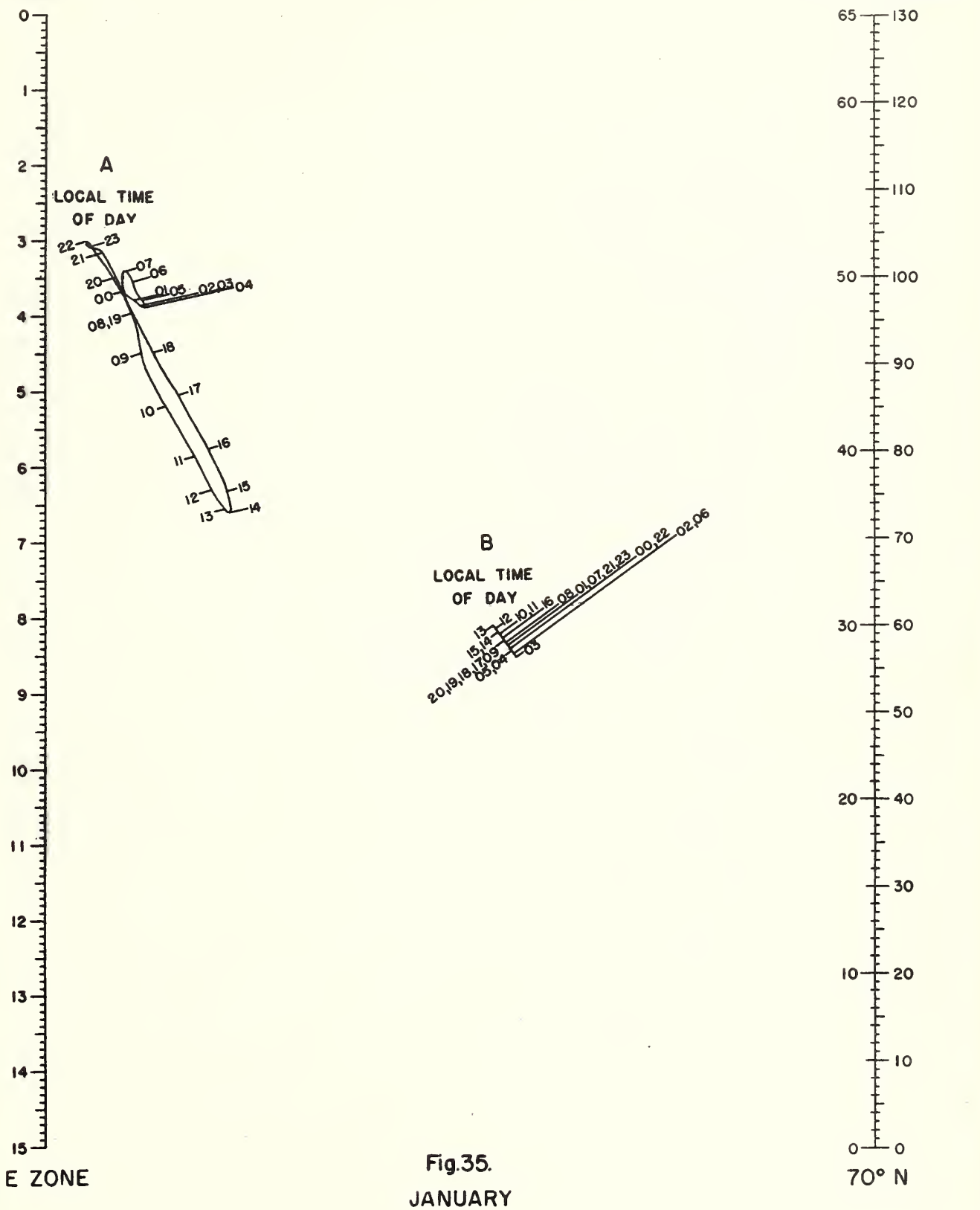

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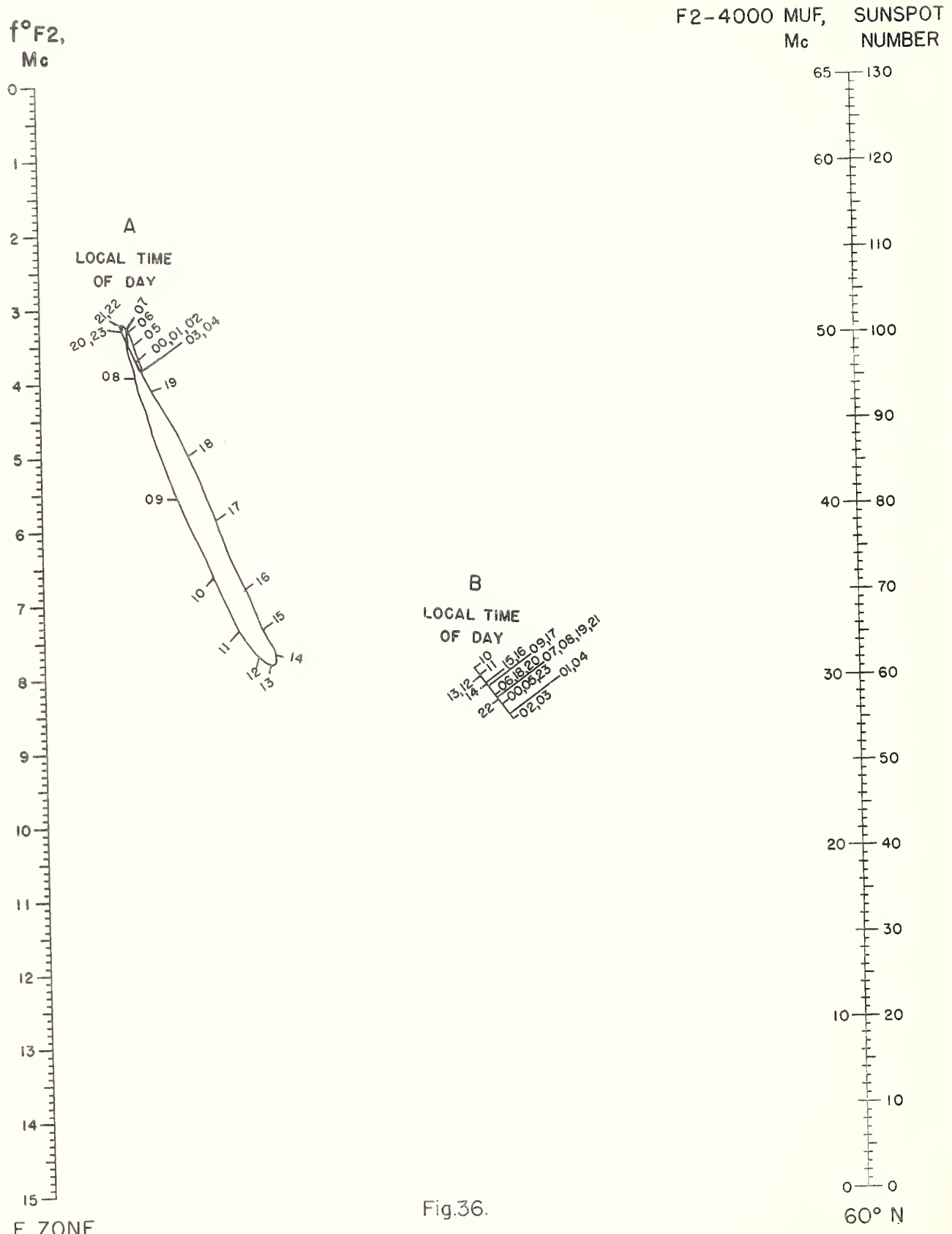

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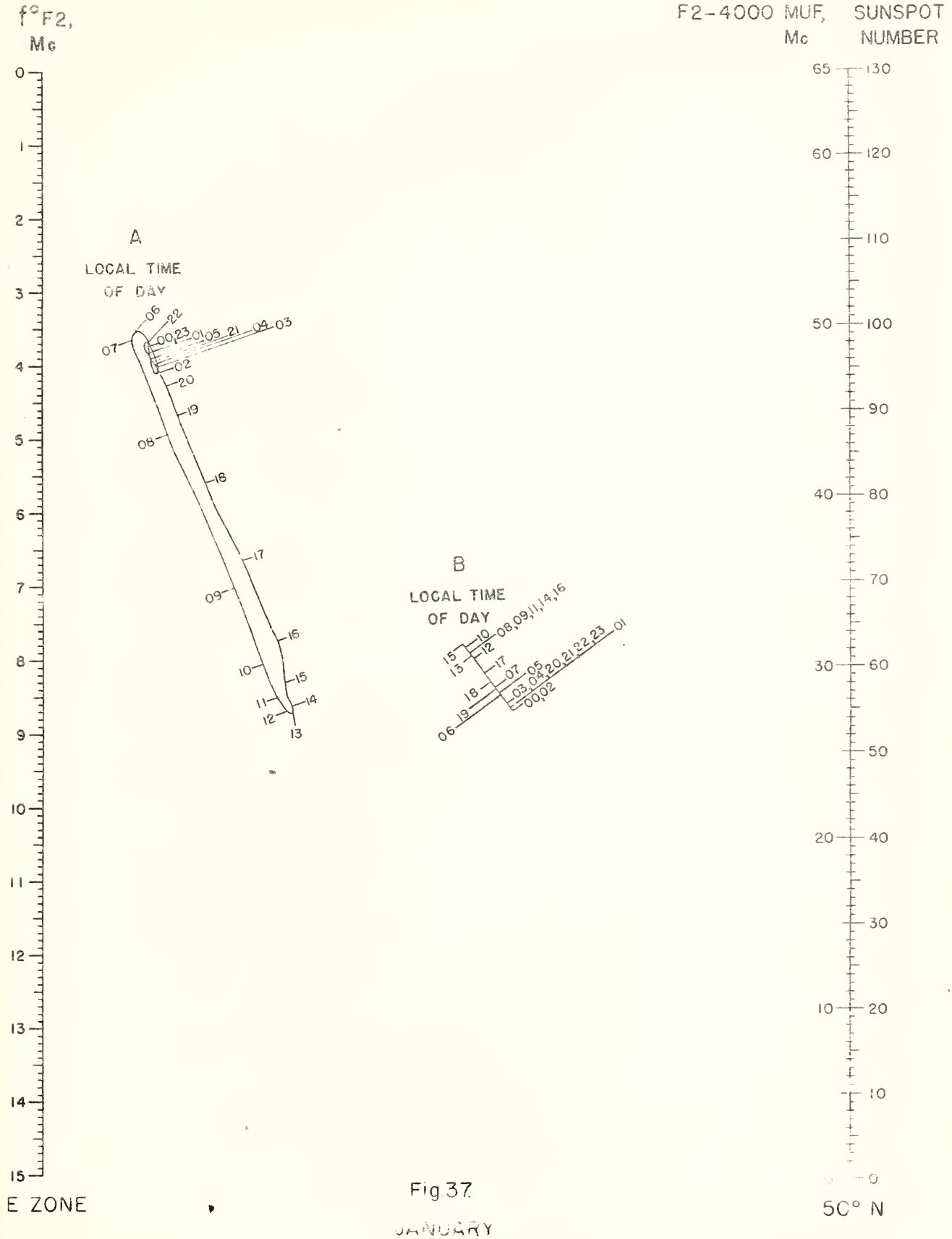
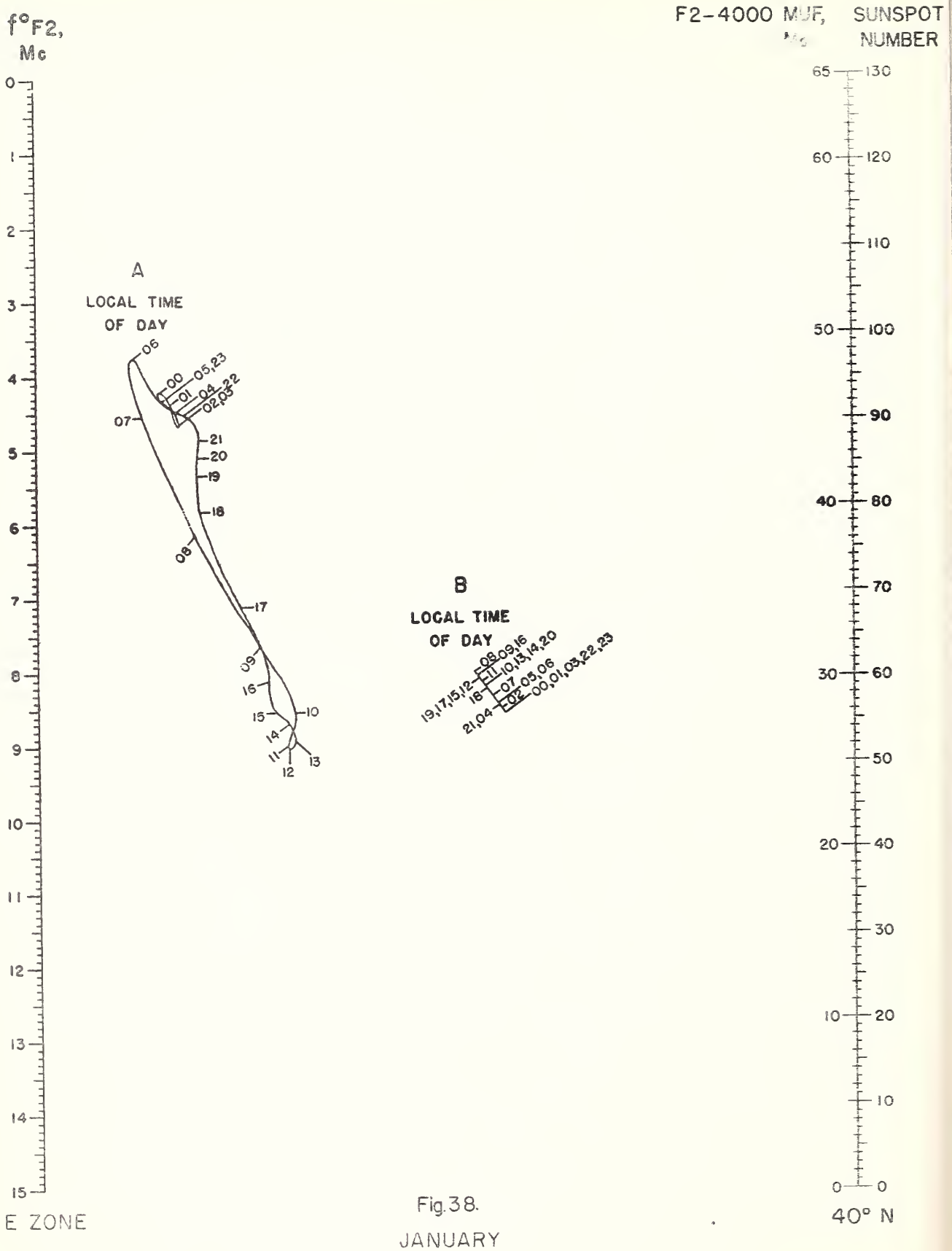


E ZONE

Fig 37.

JANUARY

50° N



E ZONE

Fig. 38.

JANUARY

40° N

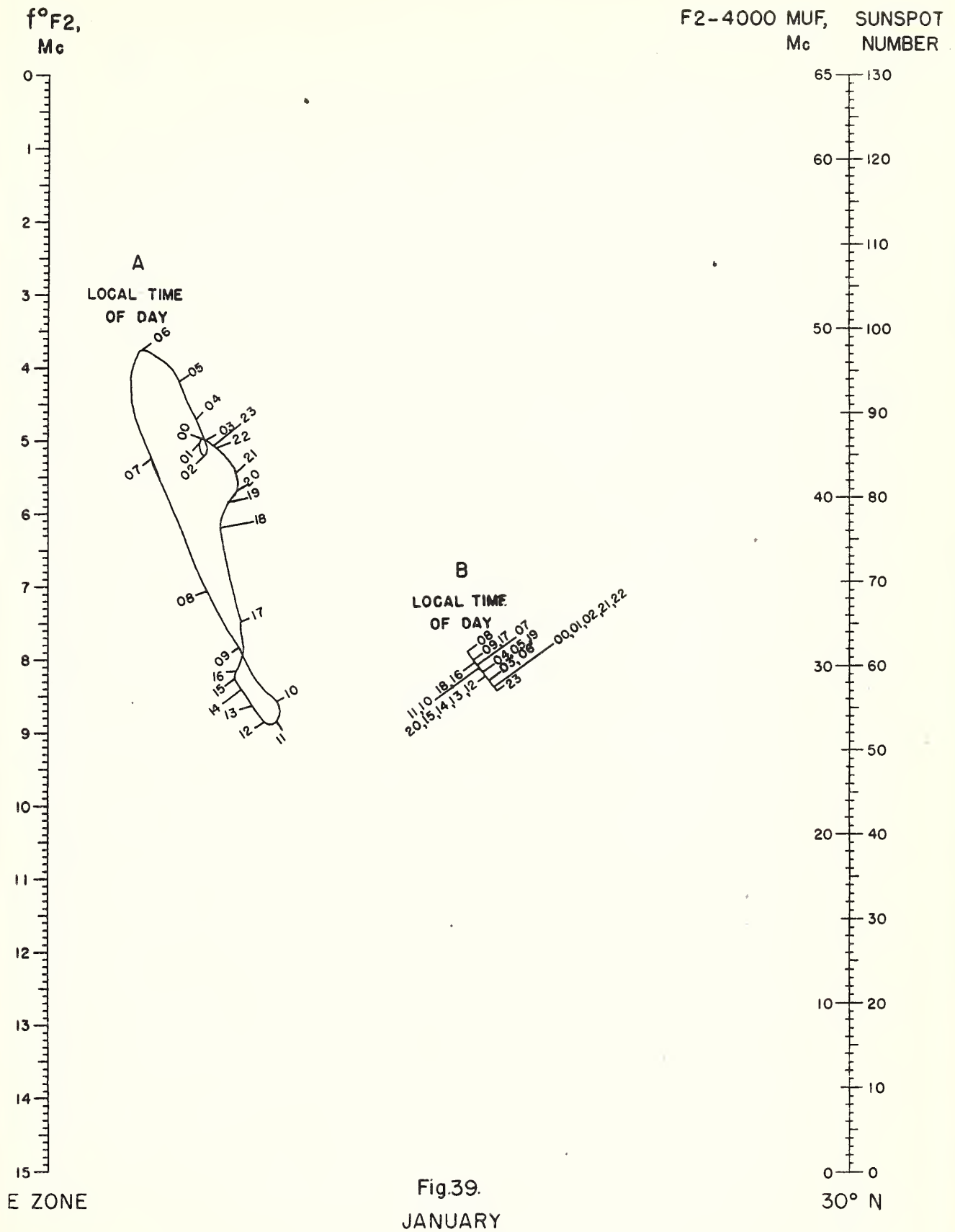


Fig.39.
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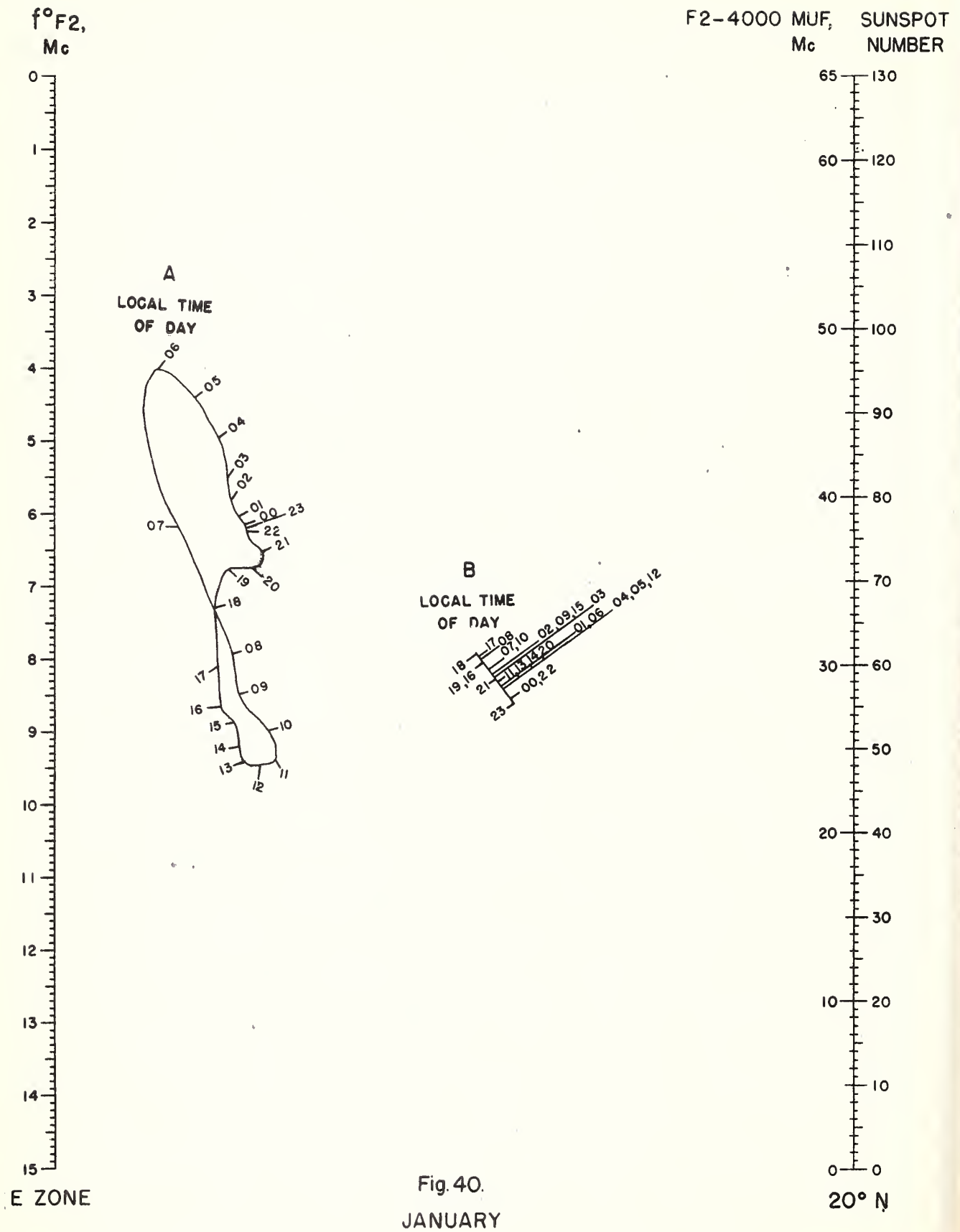

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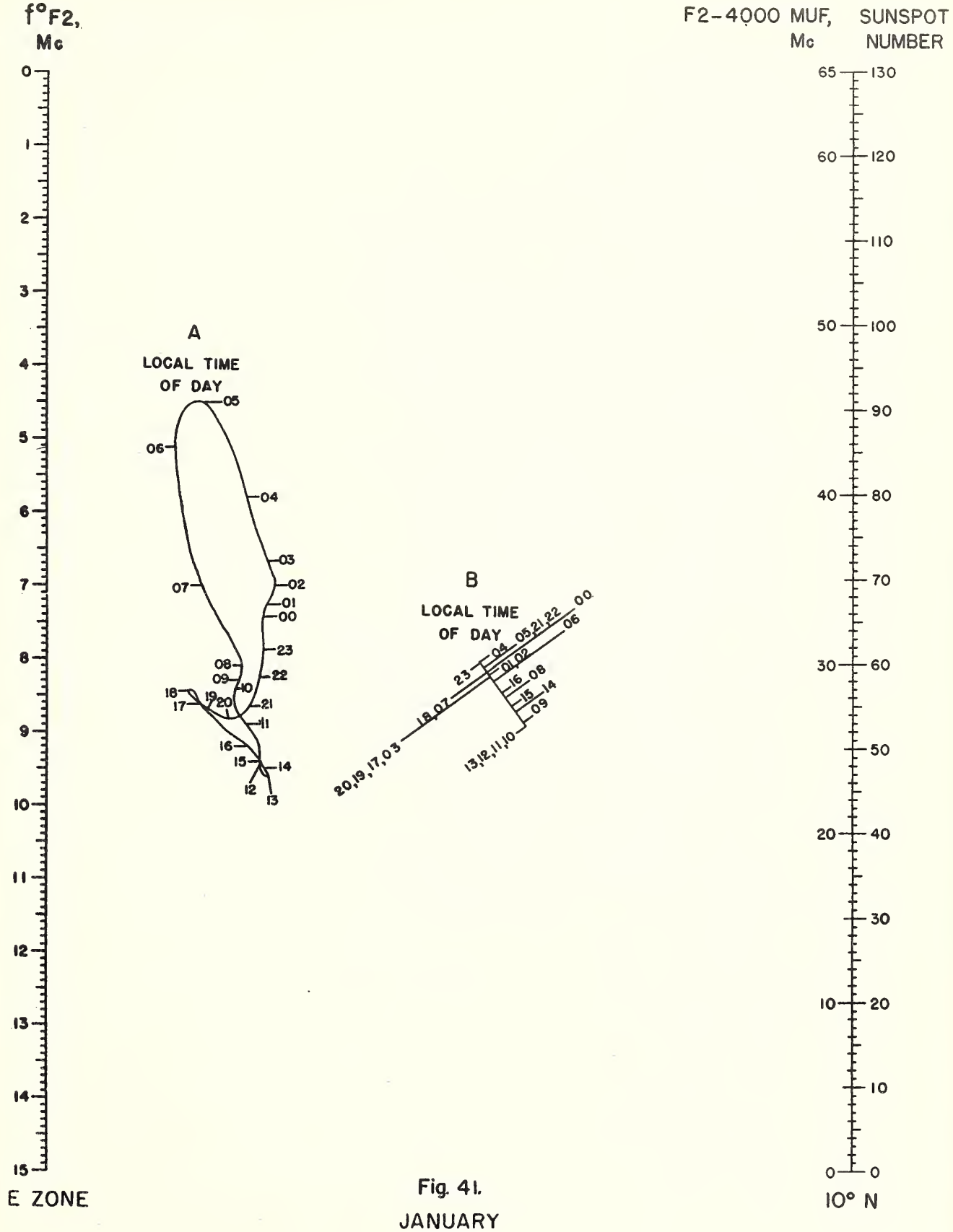

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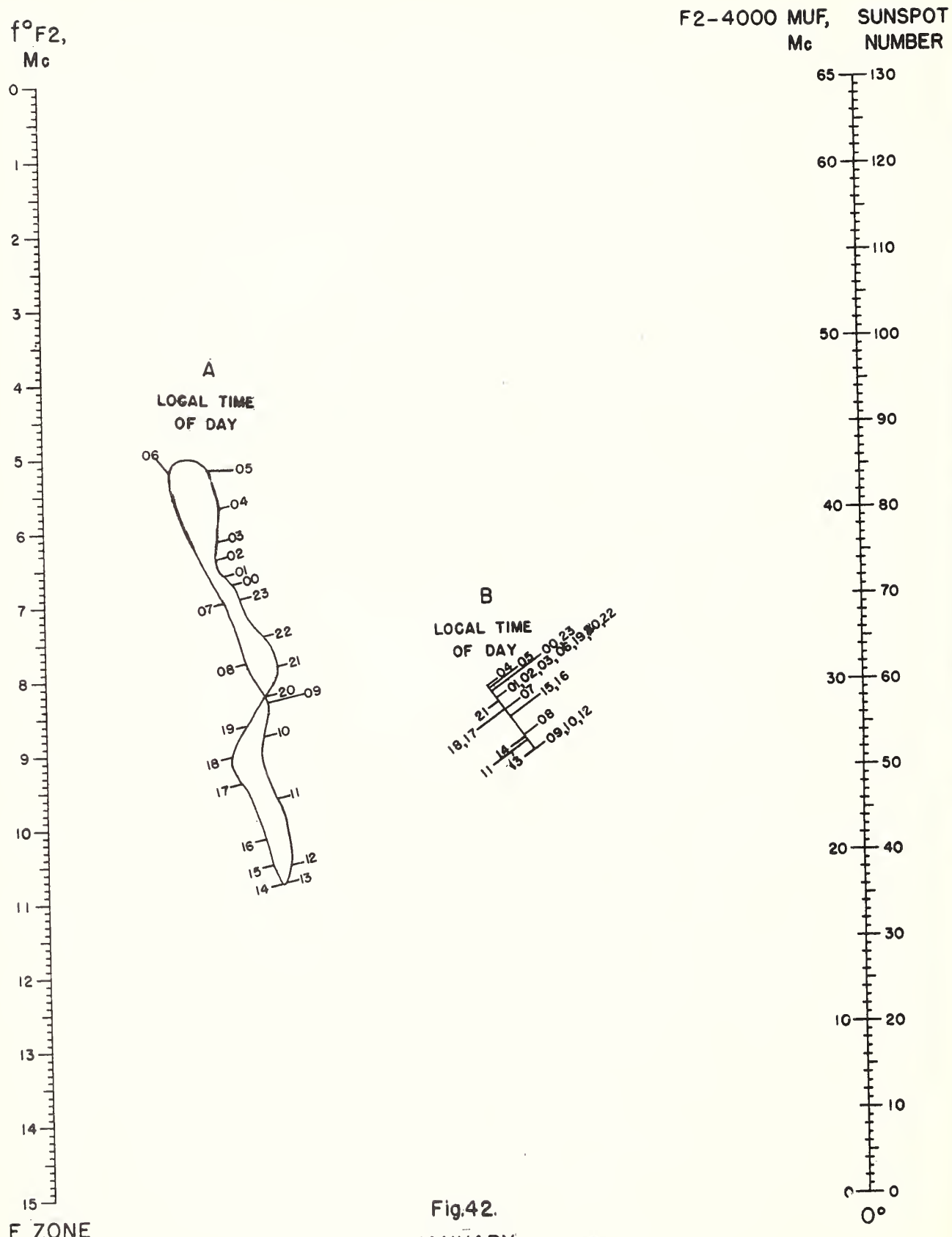

Fig.42.

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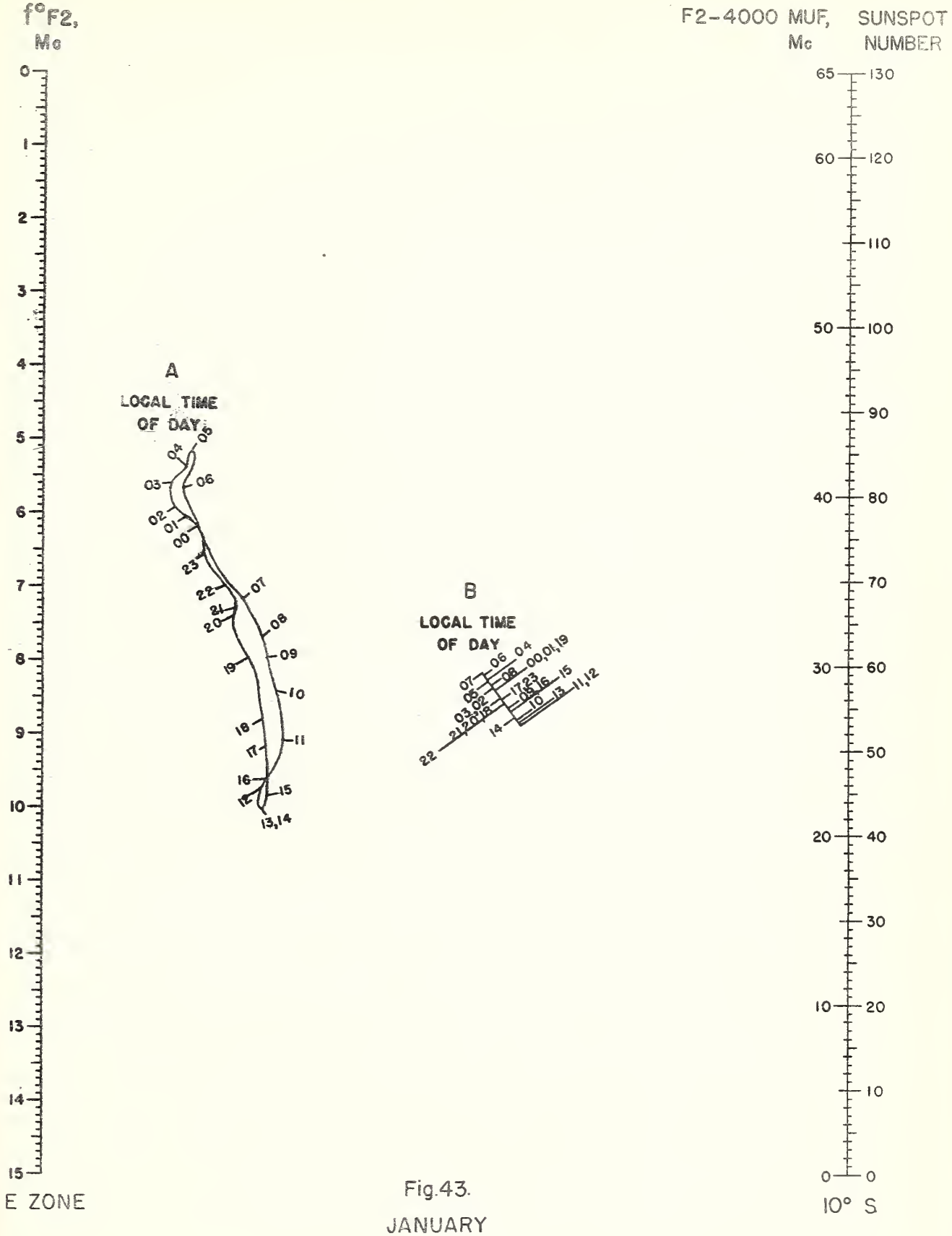

Fig.43.

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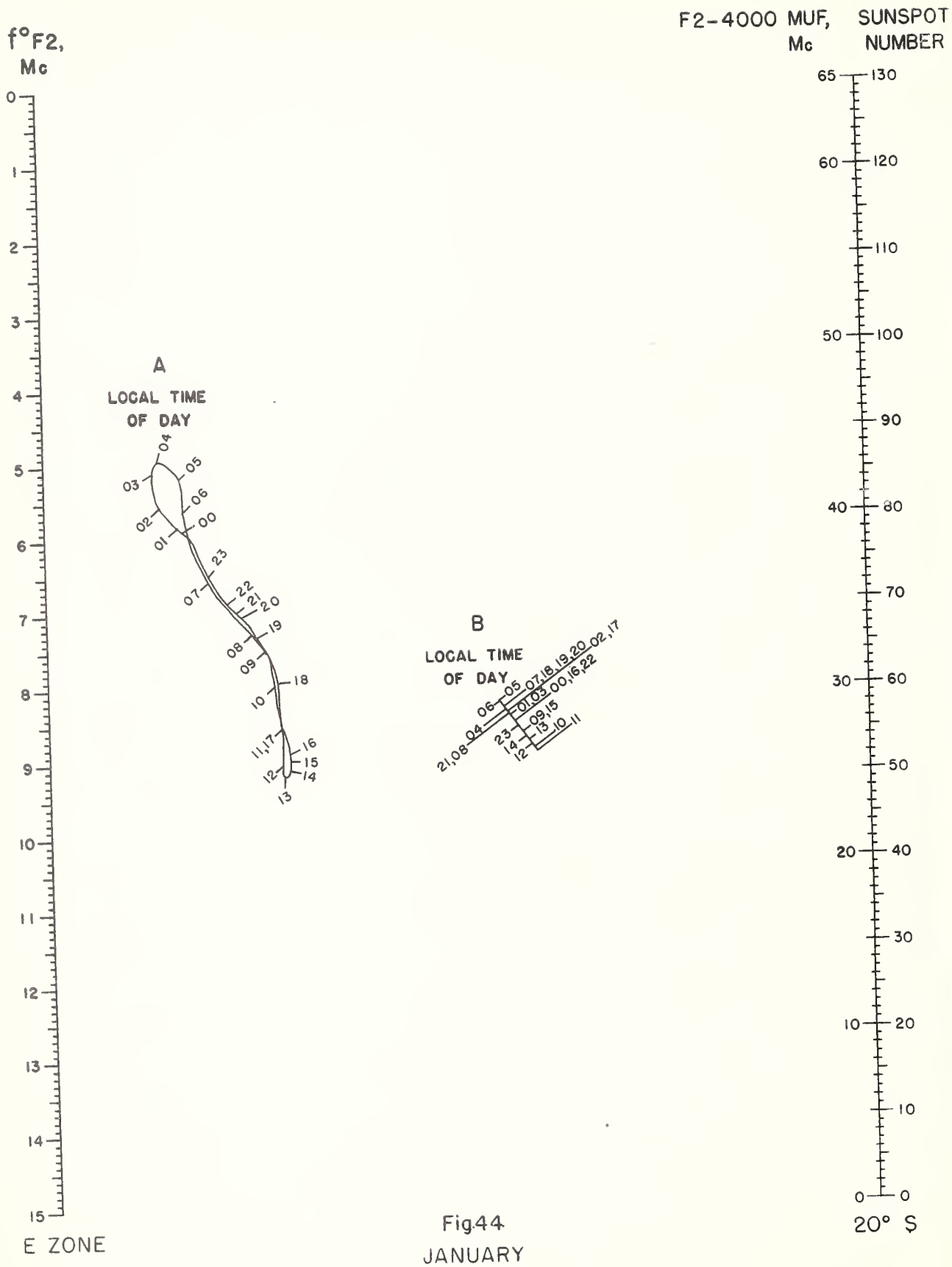

Fig.44
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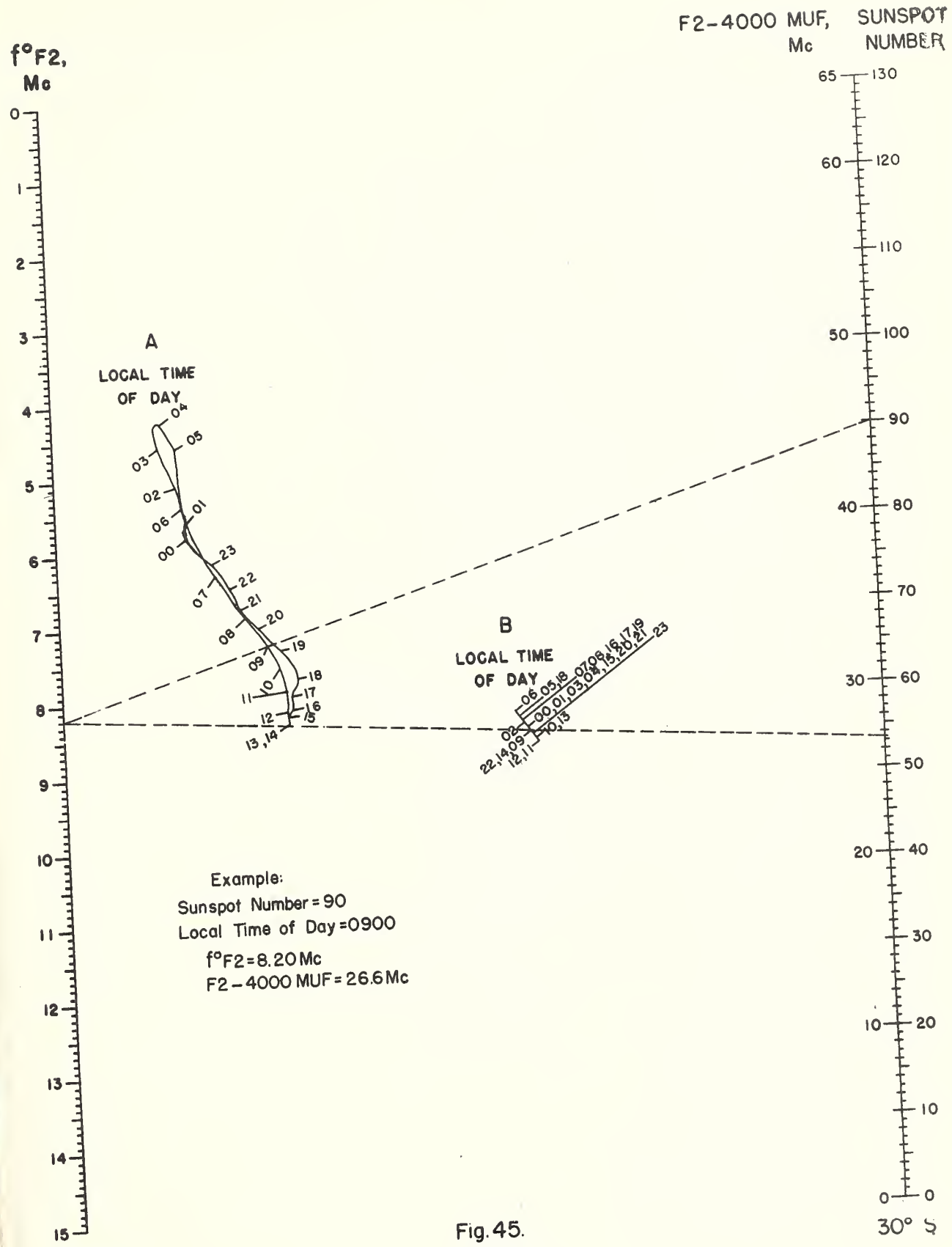

Fig. 45.

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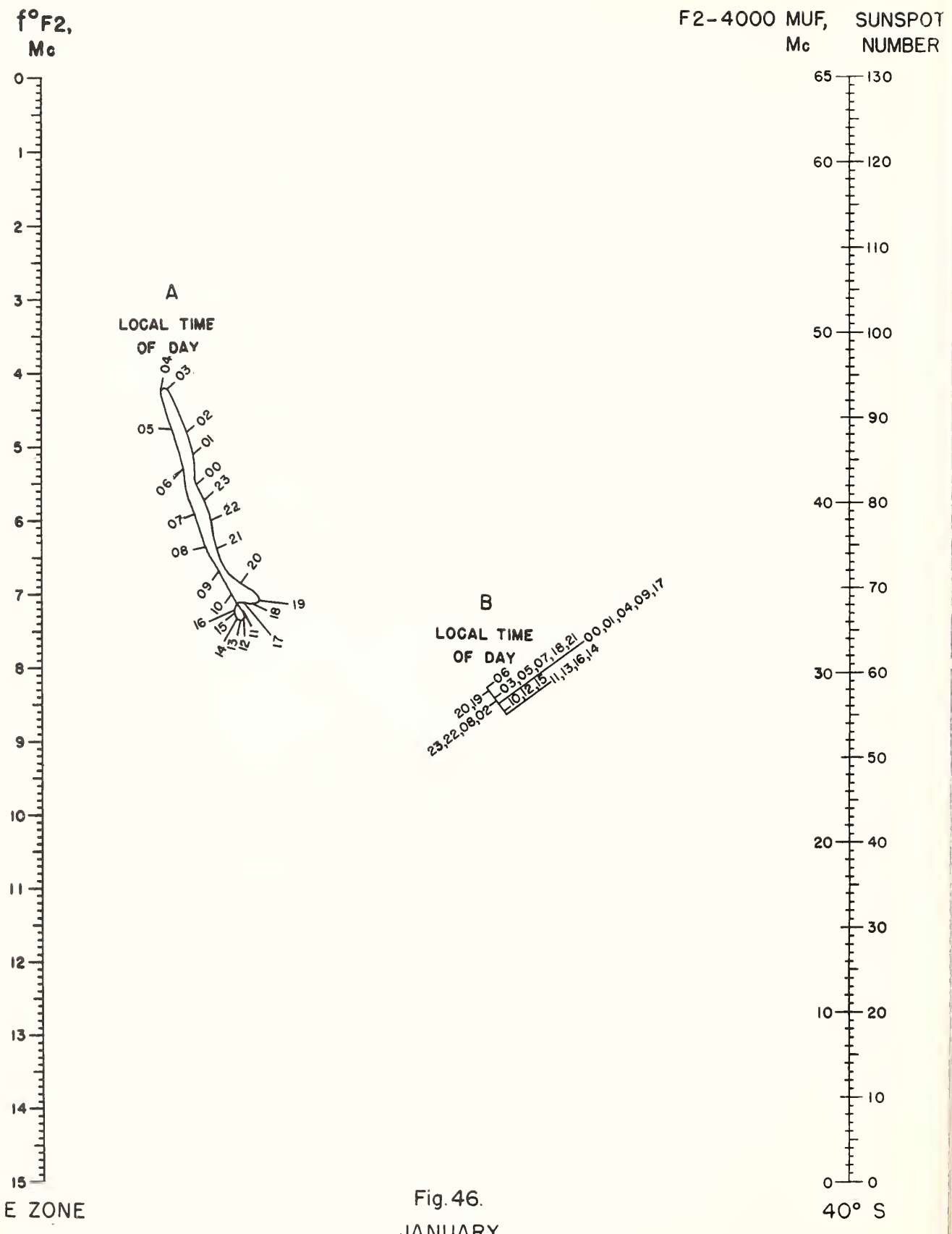

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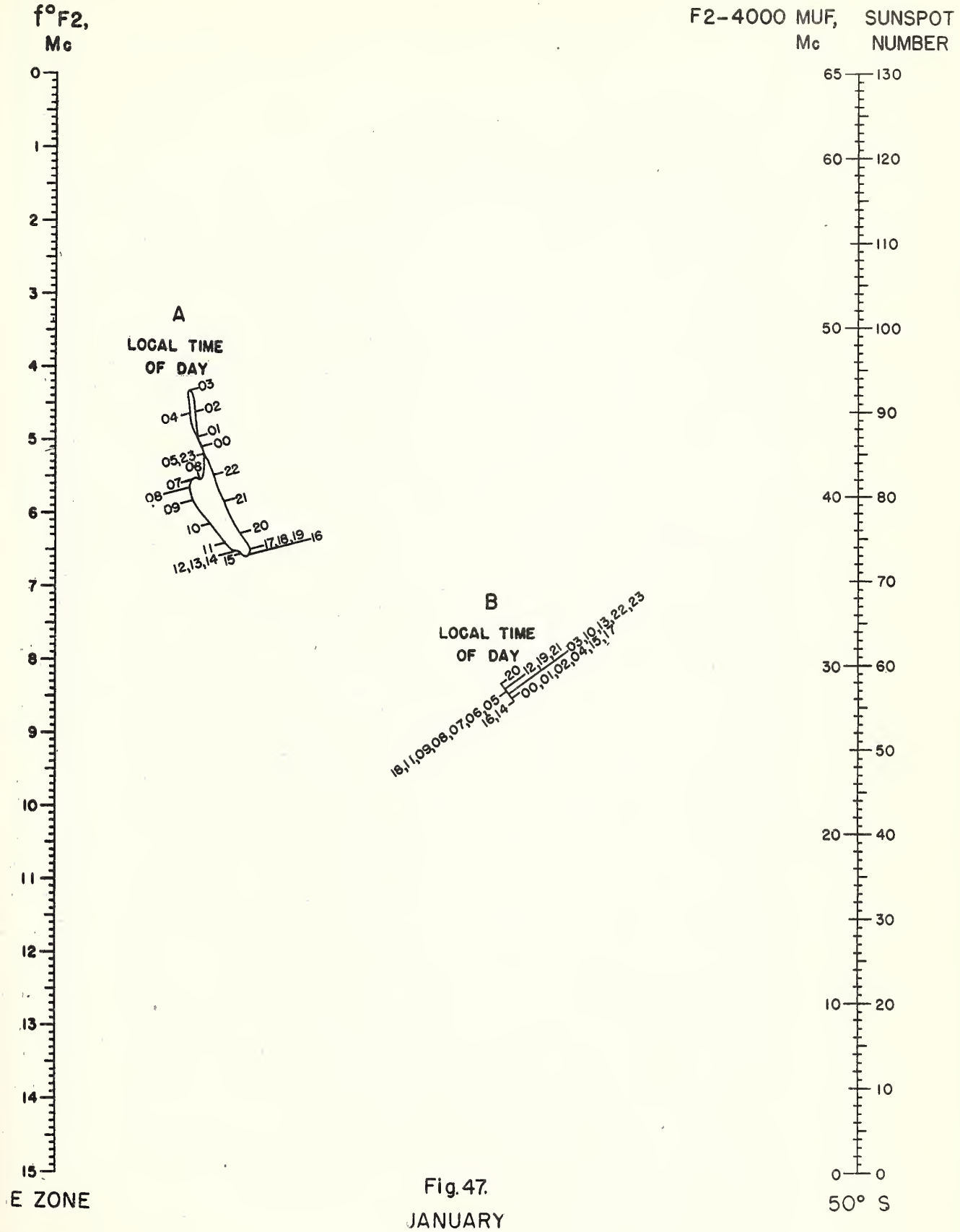

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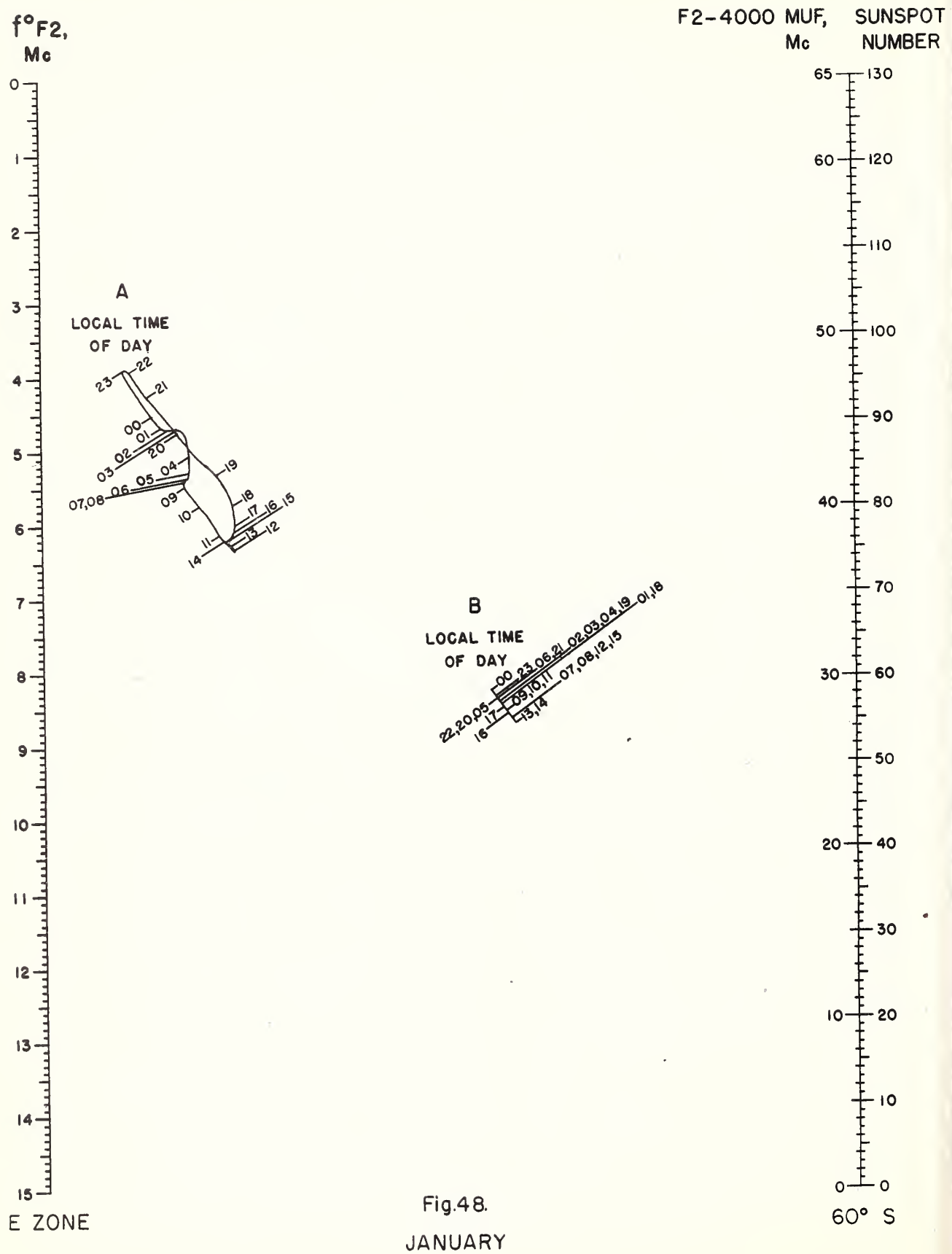

Fig.48.

JANUARY

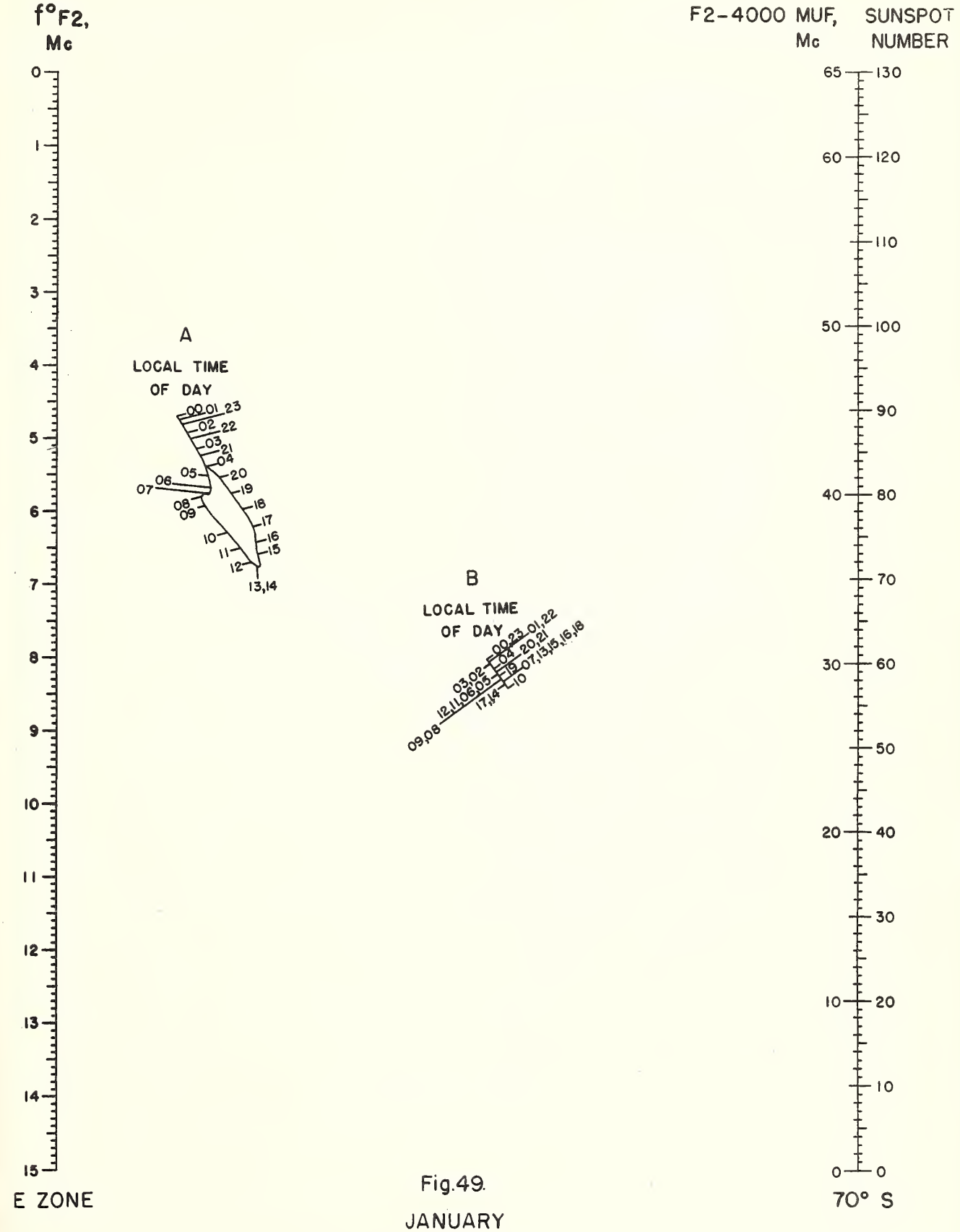

Fig.49.

JANUARY

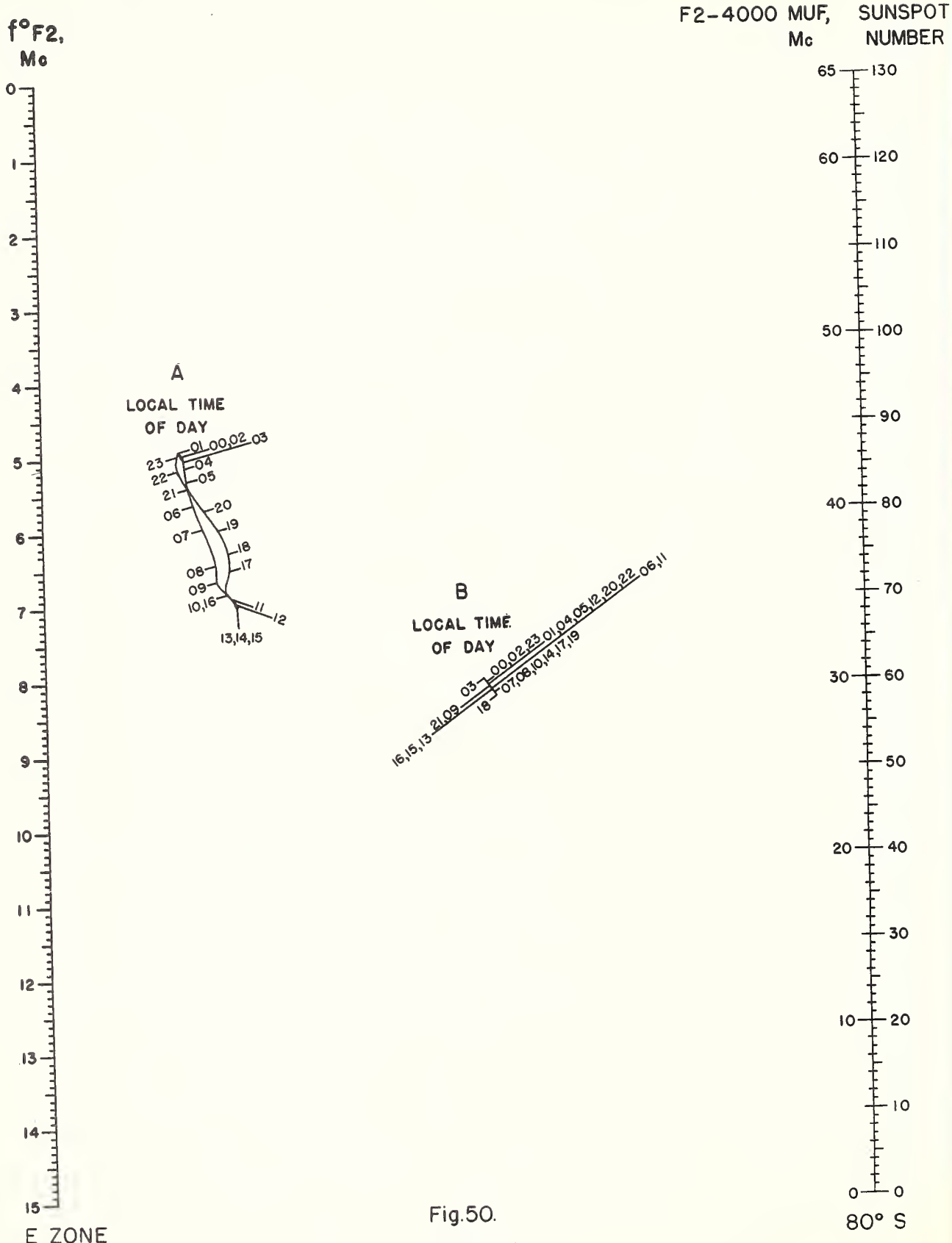

Fig.50.

JANUARY